The "Musica practica" of Bartolomeo Ramos de Pareia: A critical translation and commentary

Fose, Luanne Eris, Ph.D.

University of North Texas, 1992

Copyright ©1992 by Fose, Luanne Eris. All rights reserved.

Doctor of Philosophy (Music Theory), May, 1992, 518 pp., 20 tables, 29 illustrations, bibliography, 119 titles.

This dissertation contains the first complete Latin-English translation of one of the most controversial music theory treatises of the fifteenth century—the *Musica practica* (Bologna, 1482) of Bartolomeo Ramos de Pareia. Its title as well as its content illustrate the Renaissance transformation from the abstract mathematical approach of "musica speculativa" to that of an emphasis upon the everyday demands of the practicing musician.

Although Ramos provides traditional explanations of the modes, counterpoint, "musica ficta," and white mensural notation, his innovations in temperament, solmization, mutation, and the gamut set this treatise apart from other fifteenth-century music treatises. Ramos's rejection of the traditional Pythagorean-Boethian-Guidonian explanations, coupled with his strong polemic criticisms of the auctoritas, resulted in a treatise that remained at the center of heated debate well into the sixteenth century.

Part I of this dissertation includes a commentary in which the specific topics of the *Musica practica* are examined. Part II of this dissertation consists of a
critical translation of the *Musica practica*, with endnotes to illuminate issues that may prove confusing to the twentieth-century reader. These endnotes include translations of Franchinus Gaffurius's marginal annotations, as well as biographical information for the many musicians to whom Ramos refers in the text.

The translation is presented in parallel columns to facilitate a comparison of the original Latin text (A-80 edition) with its English translation; discrepancies between the extant editions (A-80, A-81, and A-7-35) have been catalogued in an appendix.
THE MUSICA PRACTICA OF BARTOLOMEO RAMOS DE PAREIA:
A CRITICAL TRANSLATION AND COMMENTARY

DISSE <caret>TATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

Luanne Eris Fose, B.A., M.M.
Denton, Texas
May, 1992
THE MUSICA PRACTICA OF BARTOLOMEO RAMOS DE PAREIA:
A CRITICAL TRANSLATION AND COMMENTARY

Luanne Eris Fose, B.A., M.M.

APPROVED:

Major Professor

Minor Professor

Committee Member

Committee Member

Dean of the College of Music

Dean of the Robert B. Toulouse School of Graduate Studies

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Copyright by
Luanne Eris Pose
1992
... Thanks to the immortal God, provider of all good things, who established the liberal arts for the perfection and delight of men; to Him is the glory throughout the endless ages of ages. Amen.

Bartolomeo Ramos de Pareia
_Musica practica_ (1482)
PREFACE

The primary purpose of this dissertation is to present the Musica practica (1482) of Bartolomeo Ramos de Pareia in Latin-English translation. Because the Musica practica has never been translated into English, French, or German (the "required" languages of the theory historian), researchers have often been forced to struggle with the text in its original form or to rely on secondhand information. In many instances, this has resulted in out-of-context translations that have contributed to a general misunderstanding of Ramos's musical precepts.

This translation has been organized by means of parallel columns in order to facilitate a comparison of the original Latin text with the English translation. An attempt has been made to remain as faithful as possible to the intent of the original Latin while retaining the flavor

\[1\] Johannes Wolf and Robert Stevenson point out that there are several different variants for the surname of this Spanish music theorist. In his Honesta defensio (1491), Giovanni Spataro refers to his teacher by the Latin form "Ramus"; however, in his Tractato di musica (1531), he refers to his teacher as "Ramis." Like Stevenson, this translation has adopted the form "Ramos," due to the fact that "Ramis" does not appear in Castilian and because "Ramos" is the currently preferred spelling of this Spanish surname. See Johannes Wolf, ed., Musica practica Bartolomei Rami de Pareia, (Leipzig: Breitkopf and Härtel, 1901; reprint, Wiesbaden: Breitkopf and Härtel, 1968), xii and Robert Stevenson, Spanish Music in the Age of Columbus (The Hague, Netherlands: Martinus Nijhoff, 1960), 55n.
of Ramos's personal style of rhetoric. Due to the nature of this style, filled with the typical lengthy sentences of the Latin language, some of the more lengthy sentences have been reapportioned, with the long passages of Ramos's continuous text divided into new paragraphs. At times, Ramos provides rather cryptic sentences and assumes that the reader understands the intentions of his prose; in the translation, clarification of the Latin text has been provided by means of brackets containing interpolative text.

Part I of this dissertation is comprised of a commentary upon the specific topics that have been addressed by Ramos in the *Musica practica*. Because the *Musica practica* generated several centuries of theoretical debate—with arguments often focused upon only short passages of text—this commentary attempts to investigate the validity of these discussions in light of a translation of the entire treatise.

Part II of this dissertation contains a critical translation of the *Musica practica*; this translation is preceded by technical information regarding the editions of the treatise and the procedures employed in preparing the translation. Endnotes have been provided to the English translation to illuminate issues that might have been perfectly obvious to the fifteenth-century musician but which may prove confusing to the twentieth-century reader. In addition, the endnotes provide biographical entries of
the many musicians that Ramos refers to in the *Musica practica*.

Unless otherwise noted, translations of all text and quotations are by the author of this dissertation. Quotations that have been extracted from other translations have retained the spelling and punctuation of the author cited.

*****

This translation is indebted to the scholarship of Johannes Wolf, Clemente Terni, José Luis Moralejo, and Calvin Bower, without whom such an in-depth study would not have been possible. Due to the vast nature of this project, a working knowledge of Latin, Spanish, Italian, German, French, and English was required; in this regard, I am indebted to the translation skills of Massimiliano Cannalire, Marie Perratore, and Alvaro Cano for their assistance in the translation of some of the more difficult passages in the respective languages. Most of all, I wish to express my deepest appreciation to Professor Barbara Huggins of the Department of Foreign Languages and Literatures at the University of North Texas for her patience and for the countless hours of guidance in the preparation of this translation. Her invaluable suggestions and unwavering support contributed immeasurably to the completion of this study.
I also wish to offer a very special thanks to my advisor, Dr. Thomas Sovík, who believed in this project and endeavored to do "whatever necessary" to bring it to fruition; further, I am especially grateful to the other members of my dissertation committee, Dr. Deanna Bush and Dr. Thomas Clark, for their many helpful suggestions and comments. Finally, I give praise to God for my husband Jeff--whose love, patience, and constant encouragement sustained me throughout the course of my doctoral studies.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEDICATION</strong></td>
<td>iv</td>
</tr>
<tr>
<td><strong>PREFACE</strong></td>
<td>v</td>
</tr>
<tr>
<td><strong>LIST OF TABLES</strong></td>
<td>xiv</td>
</tr>
<tr>
<td><strong>LIST OF ILLUSTRATIONS</strong></td>
<td>xvi</td>
</tr>
<tr>
<td><strong>PART I - THE COMMENTARY</strong></td>
<td></td>
</tr>
<tr>
<td><strong>I. INTRODUCTION</strong></td>
<td>2</td>
</tr>
<tr>
<td>Invective and Repercussion: Music at the End of the Fifteenth Century</td>
<td>5</td>
</tr>
<tr>
<td>Conclusion</td>
<td>16</td>
</tr>
<tr>
<td><strong>II. THE BIOGRAPHY OF BARTOLOMEO RAMOS DE PAREIA</strong></td>
<td>19</td>
</tr>
<tr>
<td>Ramos's Tenure at the University of Salamanca</td>
<td>22</td>
</tr>
<tr>
<td>Speculations on Ramos's Place of Residence (1472-82)</td>
<td>27</td>
</tr>
<tr>
<td>Ramos in Bologna</td>
<td>31</td>
</tr>
<tr>
<td>Ramos in Rome</td>
<td>35</td>
</tr>
<tr>
<td>Conclusion</td>
<td>37</td>
</tr>
<tr>
<td><strong>III. THE DIVISION OF THE MONOCHORD ACCORDING TO BARTOLOMEO RAMOS DE PAREIA</strong></td>
<td>39</td>
</tr>
<tr>
<td>The Tetrachord and the Three Genera</td>
<td>43</td>
</tr>
<tr>
<td>Pythagoreian Tuning</td>
<td>50</td>
</tr>
<tr>
<td>Traditional Applications of the Monochord</td>
<td>53</td>
</tr>
<tr>
<td>Ramos's Division of the Monochord</td>
<td>55</td>
</tr>
<tr>
<td>Conclusion</td>
<td>64</td>
</tr>
</tbody>
</table>
IV. THE APPLICATION AND EVALUATION OF THE MONOCHORD
ACCORDING TO THE DIVISION PROPOSED BY
BARTOLOMEO RAMOS DE PAREIA ................. 65

Lindley's Misinterpretation (1975) of
Ramos's Tuning ............................. 74
Conclusion ................................ 87

V. PSALLITUR PER VOCES ISTAS: AN ALTERNATIVE
TO GUIDONIAN SOLMIZATION ..................... 91

Ramos's Discussion of the Gamut ............ 95
Ramos's Alternative to Guidonian
Solmization .................................. 96
The Guidonian Hand .......................... 102
Conclusion ................................ 106

VI. THE GAMUT, MUTATION, AND MUSICA FICTA .... 108

The Manus Perfecta .......................... 113
Ramos's Discussion of Mutation ............ 115
Ramos's Discussion of Musica Ficta ....... 119
The Concept of the Subintellectus: ......... 126
Conclusion ................................ 129

VII. THE MODES ................................. 131

Conclusion ................................ 141

VIII. COUNTERPOINT ............................. 143

Consonance and Dissonance ................. 143
The Rules of First Species
Counterpoint ................................ 145
The Practical Use of the Tritone .......... 148
Successive Counterpoint and Fugue .......... 152
Conclusion ................................ 156

IX. THE MUNDUS ET MUSICA ET TOTUS CONCENTUS:
AN EXAMINATION OF SIVE LIDION IN SYNEMMENON ...... 157

Possible Solutions to the Canon .......... 162
Conclusion ................................ 173

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
PART II - THE TRANSCRIPTION AND TRANSLATION

NOTES ON THE EDITIONS, TRANSCRIPTIONS, AND TRANSLATIONS OF THE MUSICA PRACTICA

The Editions ........................................ 177
The Transcriptions and Translations ............ 185
The Procedures for the Translation ............. 186

THE MUSICA PRACTICA OF BARTOLOMEO RAMOS DE PAREIA

PART 1, TREATISE 1:

Prologue ............................................. 192
Chapter 1: [No Title] ......................... 198
Chapter 2: The Division or Arrangement of the Elementary Monochord ....... 202
Chapter 3: A Correct Understanding of the Given Divisions ....... 206
Chapter 4: A Detailed Application of the Preceding Figure for the Singer's Use ......... 217
Chapter 5: A Clear Explanation of the Error of Some in Respect to the Aforementioned .......... 222
Chapter 6: A Brief Note Concerning Various Instruments ........ 226
Chapter 7: The Detailed Manner of Joining the Voice with an Instrument ... 233
Chapter 8: [No Title] ......................... 242

PART 1, TREATISE 2:

Chapter 1: In Which it is Shown How the Sound Should be Figured Graphically ............ 246
Chapter 2: An Explanation of Musica Ficta .... 253
Chapter 3: [Missing] ......................... 261
Chapter 4: Concerning the Permutation of the Notes ............. 262
Chapter 5: Rejecting Some Matters of the Past and Demonstrating the Correct Method of the Coniunctae ....... 268
Chapter 6: The Difference of Music is Not in Quality but in Quantity ........ 285
Chapter 7: Refuting the Followers of Guido and Demonstrating in Greater Detail the Truth of the Matter ...... 291

xi
Chapter 8: In Which it is Explained in Detail in How Many Ways Each Species May be Made

PART 1, TREATISE 3:

Chapter 1: In Which a Complete Understanding of the Tones, Modes, or Tropes is Established

Chapter 2: Concerning the Origin of the Tones

Chapter 3: In Which the Conformity of Musica Mundana, Musica Humana, and Musica Instrumentalis is Shown By Means of the Tones

PART 2, TREATISE 1:

Chapter 1: In Which a Knowledge of the Consonant and Dissonant Notes is Established

Chapter 2: In Which the Error of Some is Refuted and the Truth is Demonstrated

PART 3, TREATISE 1:

Chapter 1: In Which the Harmonic Numbers are Copiously Treated

Chapter 2: In Which the Signs [are Treated] By Which the Rhythms are Distinguished

Chapter 3: In Which the Signs of the Other Species [are Treated]

Chapter 4: In Which the Canons and Their Subscriptions are Explained in Great Detail

PART 3, TREATISE 2:

Chapter 1: In Which the Three Genera of Proportions are Discussed in Great Detail

Chapter 2: In Which the Harmonic Mean is Distinguished

Chapter 3: In Which the Primary Divisions of the Monochord are Applied to the Numerical Ratios
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Greater Perfect System According to Boethius</td>
<td>45</td>
</tr>
<tr>
<td>2. The Lesser Perfect System According to Boethius</td>
<td>46</td>
</tr>
<tr>
<td>3. The Deduction of the Pythagorean Ratios from the Differences of the Intervals</td>
<td>52</td>
</tr>
<tr>
<td>4. The Pythagorean Diatonic Scale</td>
<td>52</td>
</tr>
<tr>
<td>5. Didymus's Diatonic Tuning Applied to the C Major Scale</td>
<td>61</td>
</tr>
<tr>
<td>6. Ptolemy's Syntonic-Diatonic Tuning Applied to the C Major Scale</td>
<td>61</td>
</tr>
<tr>
<td>7. Ramos's Diatonic Division of the Monochord Applied to the C Major Scale</td>
<td>62</td>
</tr>
<tr>
<td>8. The Chromatic Scale According to Pythagorean Tuning</td>
<td>62</td>
</tr>
<tr>
<td>9. The Chromatic Scale According to Ramos's Division of the Monochord</td>
<td>63</td>
</tr>
<tr>
<td>10. Evaluation of Semitones in Cents According to Ramos's Division</td>
<td>67</td>
</tr>
<tr>
<td>11. Evaluation of Whole Steps in Cents According to Ramos's Division</td>
<td>68</td>
</tr>
<tr>
<td>12. Evaluation of Semiditones in Cents According to Ramos's Division</td>
<td>70</td>
</tr>
<tr>
<td>13. Evaluation of Ditones in Cents According to Ramos's Division</td>
<td>71</td>
</tr>
<tr>
<td>14. Evaluation of the Diapente in Cents According to Ramos's Division</td>
<td>72</td>
</tr>
<tr>
<td>15. Evaluation of the Diatessaron in Cents According to Ramos's Division</td>
<td>73</td>
</tr>
<tr>
<td>Table</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>17. The Eight Modes According to Ramos</td>
<td>132</td>
</tr>
<tr>
<td>18. The Correspondence Between <em>Musica Instrumentalis</em> and <em>Musica Humana</em></td>
<td>134</td>
</tr>
<tr>
<td>19. The Correspondence Between <em>Musica Instrumentalis</em> and <em>Musica Mundana</em></td>
<td>136</td>
</tr>
<tr>
<td>20. A Comparison of the Contrapuntal Rules of Ramos and Gaffurius</td>
<td>146</td>
</tr>
<tr>
<td>Figure</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>1.</td>
<td>78</td>
</tr>
<tr>
<td>Ramos's Proposed Alternative to the Traditional Double Leading-Tone Cadence</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>81</td>
</tr>
<tr>
<td>Ramos's Lower and Upper Leading-Tone Cadences</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>82</td>
</tr>
<tr>
<td>Ramos's Alternatives to the Traditional Burgundian Cadence</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>104</td>
</tr>
<tr>
<td>Figura 3 of the Musica practica</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>105</td>
</tr>
<tr>
<td>Figura 6 of the Musica practica</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>114</td>
</tr>
<tr>
<td>Figura 4 of the Musica practica</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>116</td>
</tr>
<tr>
<td>Explicit Mutation</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>117</td>
</tr>
<tr>
<td>Implicit Mutation</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>128</td>
</tr>
<tr>
<td>The Semitonus Subintellectus</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>129</td>
</tr>
<tr>
<td>The Semiditonus Subintellectus</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>139</td>
</tr>
<tr>
<td>Figura 7 of the Musica practica</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>140</td>
</tr>
<tr>
<td>Frontispiece to Gaffurius's Practica musicae</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>155</td>
</tr>
<tr>
<td>Imitation at the Fourth Below</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>155</td>
</tr>
<tr>
<td>Imitation at the Fifth Above</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>155</td>
</tr>
<tr>
<td>Imitation at the Octave</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>163</td>
</tr>
<tr>
<td>Frontispiece to Florence, Biblioteca Nazionale Centrale MS Banco Rari 229, fol. IIIv.</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>164</td>
</tr>
<tr>
<td>Perpetual canon, 1st version; Lydian mode</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>165</td>
</tr>
<tr>
<td>Perpetual canon, 2nd version; Hypolydian mode</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>167</td>
</tr>
<tr>
<td>Perpetual canon, 3rd version; beginning in the Lydian mode</td>
<td></td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>20.</td>
<td>Perpetual canon, 4th version; beginning in the Hypolydian mode</td>
</tr>
<tr>
<td>21.</td>
<td>Figura 1 of the Musica practica</td>
</tr>
<tr>
<td>22.</td>
<td>Figura 2 of the Musica practica</td>
</tr>
<tr>
<td>23.</td>
<td>Figura 3 of the Musica practica</td>
</tr>
<tr>
<td>24.</td>
<td>[P]sallitur per voces istas</td>
</tr>
<tr>
<td>25.</td>
<td>Figura 4 of the Musica practica</td>
</tr>
<tr>
<td>26.</td>
<td>Figura 5 of the Musica practica</td>
</tr>
<tr>
<td>27.</td>
<td>Figura 6 of the Musica practica</td>
</tr>
<tr>
<td>28.</td>
<td>Figura 7 of the Musica practica</td>
</tr>
<tr>
<td>29.</td>
<td>Figura 8 of the Musica practica</td>
</tr>
</tbody>
</table>
PART I

THE COMMENTARY
CHAPTER I

INTRODUCTION

The Musica practica (Bologna 1482) of Bartolomeo Ramos de Pareia was one of the most controversial music theory treatises of the fifteenth century. Although many of Ramos's propositions were rejected by his contemporaries, few other fifteenth-century theorists had such a monumental impact upon their musical community and the subsequent development of Western music theory.

The Musica practica, even in its title, illustrates the transformation in the Renaissance from an emphasis on musica speculativa to that of musica practica. Ramos was not greatly concerned with the speculative or mathematical aspects of music theory that were represented in the medieval quadrivium; rather, he endeavored to provide an approach that would be readily applicable to the everyday demands of the practicing singer-musician. Ramos's attempt to meet the needs of the performer stand in direct contrast to many of his predecessors who, in contrast, viewed the practicing musician with disdain.

The Renaissance was an era in which the role of the speculative theorist was redefined by the need for an uncomplicated assimilation of theory and practice. Treatises that addressed practical issues appeared with
increasing frequency in the late fifteenth century, and theorists themselves openly admitted the necessity to integrate practice with theory:

A pure and simple singer is like a body without a mind, since no one can be a good singer without a thorough [knowledge] of counterpoint . . . .

... for a practicing musician without [speculative] theory is like a blind man without a walking stick.2

The Musica practica of Ramos figures predominantly in the history of music theory because of Ramos's theoretical propositions that stand in direct opposition to Pythagorean-Boethian-Guidonian explanations of Western music. Although Ramos provides traditional explanations of such topics as the modes, counterpoint, musica ficta, and white mensural notation,3 he proposes new approaches to aspects of


2"... practicus enim sine theorica est tamquam caecus sine baculo." Letter dated May 6, 1535 from Giovanni del Lago to Lorenzo Gazio. See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 85r-101v or Bologna, Liceo Musicale MS B107-1, 135-162.

3The topics of the modes, counterpoint, and musica ficta are addressed in Part I of this dissertation; because Ramos subscribes to the traditional rhythmic concepts that were established by Franco of Cologne (ca. 1280), there is no need for a comparable discussion of rhythm. Although Ramos devotes an entire section of the Musica practica to the subject of rhythm, remaining true to his mission of practicality he avoids the detailed explanations of complex proportions that are typical of speculative treatises of the fifteenth century. Ramos concentrates upon only the
temperament, solmization, mutation, and to even the gamut itself. One of the most revolutionary concepts advanced by Ramos involves the determination of pitch proportions and their realization on the monochord. Ramos simplifies the Pythagorean ratios for the major and minor thirds from 81:64 and 32:27 to 5:4 and 6:5, respectively. This modification lays the foundation for Zarlino's dual system of harmony and contributes to the shift from a modal system to that of a tonal system.

Yet another innovative but controversial idea is Ramos's proposal for a new method of solmization and mutation. The application of Guido's system of solmization based upon the hexachords of C, F, and G had become a speculative encumbrance to the music of the late fifteenth century. With the rise in chromaticism and the general acceptance of hexachords on nearly every pitch—largely brought about by John Hothby's treatise Calliope legale—Ramos felt that the Guidonian system no longer served its original purpose of simplifying the task of the practicing musician. Ramos proposes a system containing eight notes, as opposed to six, based upon the syllables Psal-li-tur per vo-ces is-tas. This system, beginning on the note C,
required only one mutation rather than the multiple mutations inherent in the Guidonian system. Because musicians had come to rely on the placement of mi-fa for the identification of the semitone's position, traditionalists were highly critical of Ramos's innovation. Despite the intense opposition to the new "octochordal" solmization method, Ramos's proposal was not overlooked by the theorists of succeeding generations; it provided the basis for the "fixed do" solfege of the Common Practice Period.

**Invective and Repercussion: Music at the End of the Fifteenth Century**

Ramos himself predicted the reactions and (false) accusations that he was to receive from his contemporaries. Ramos was accused of both failing to read and of failing to understand the speculative concepts of Boethius and Guido; however, it is quite evident from his discussions of theoretical concepts and from his criticism of individual theorists, that the charges of his contemporaries were unsubstantiated. Ramos, in fact, was an extremely literate musician-theorist.

Although Ramos was a Spaniard residing in Italy at the time that he wrote his treatise, he elected to continue the academic tradition of writing in Latin as opposed to the vernacular Spanish or Italian. Because Ramos was an innovative man who concentrated upon the practical aspects
of music, one might expect the Music practica to have been written in the vernacular. Ramos realized, however, that in order to refute the authority of his esteemed predecessors and exert any authority of his own, he must address the musical-scholarly community according to the typical academic conventions. Thus, the choice of Latin as the language for the Musica practica was a conscious effort in an attempt to establish himself as a respected scholar.

Ramos's harsh, vitriolic manner stands in stark contrast to that of his predecessors. It was customary for theorists, when criticizing other authors, to merely allude to those who represented a differing point of view. Ramos, however, does not hesitate to criticize his colleagues by name, nor does he hesitate to malign a number of the most revered musicians in history; such attacks were directed toward St. Gregory the Great, Odo of Cluny, Guido d'Arezzo, Marchettus de Padua, Johannes de Muris, Ugolino of Orvieto, Johannes Tinctoris, Tristan de Silva, Pedro de Osma, Johannes de Santo Domingo, Robertus Anglicus, John Hothby, and Roger Caperon.

Ramos's disdain for the traditions of the past and his rejection of the authority of Guido and Boethius created a great deal of controversy in the musical circles of Italy. Although Ramos's criticisms are valid, the disrespectful manner in which he presented those criticisms resulted in the inability of his colleagues to objectively assess them.
Due to a reverence for the auctoritas of the past and a loyalty to their own teachers, the reactions of Ramos's colleagues were charged with emotion. Such an impassioned environment resulted in a series of polemic attacks and responses. Participants in this long-running quarrel include such figures as the Italian theorists Nicolaus Burtius, Franchinus Gaffurius, and Giovanni Spataro, as well as the English theorist John Hothby. As might be expected, Ramos had several faithful disciples who held him and his theories with the highest esteem. Ramos's most ardent supporter, Giovanni Spataro, defended the personal character and theoretical concepts of his teacher long after the death of his mentor.

The first published response to the Musica practica is the Musices opusculum (1487) of Nicolaus Burtius. Burtius, a former student of Ramos and a disciple of Johannes Gallicus of Mantua, vehemently attacks Ramos for his dissolution of the Guidonian hexachord system and for his proposal of a solmization system that is based upon the octave. Burtius not only criticizes Ramos's innovations, but insults Ramos personally, engaging in name-calling and highly emotional denouncements of Ramos's character.

---

It would appear that Burtius’s disapproving attitude toward Ramos runs deeper than his opposition to Ramos’s controversial theories, which Burtius believed would undermine musical tradition. It is probable that Burtius’s reactions are largely a result of a negative experience as a student under Ramos. In the *Honesta defensio* (1491) of Giovanni Spataro—which, for the most part, is a reaction to Burtius’s attacks against Ramos—Spataro reminds Burtius of an occasion when he had presented a selection of his contrapuntal compositions to Ramos for examination; after examining them, Ramos advised Burtius to refrain from performing his compositions until he had learned more about counterpoint:

And do you not remember when you showed my very learned teacher some of your compositions which were composed with such ignorance that you were not even able to match the contrabass with the soprano? For if the tenor was a fifth or a third from the soprano, the contrabass was a fifth below the tenor, which resulted in a ninth or a seventh with the soprano. And when my teacher humbly instructed you to refrain from showing those songs of yours to anybody before you had learned a little more, you became stupidly enraged against his paternal correction.5

5"E non ti ricorda quando al mio doctissimo maestro mostrasti certe tue compositione composte cum tanta ignorantia, che tu non concordavi il contra cum il soprano. Ma se el tenore era quinta o terza cum lo soprano, lo contra era quinta sotto il tenore, che veniva a essere una nona, o una septima cum lo soprano; e perche il mio maestro humilmente te disse non mostrar questi toi canti fora finche non hai imparato un poco, te adirassi, come pessimo, a la paterna corectione." See Giovanni Spataro, *Johannis Spadarii musices ac Bartholomei Rami Pareile Honesta defensio in Nicolai Burtii Parmensis opusculum* (Bologna, 1491), facsimile edition ed. Guiseppe Vecchi, vol. I, *Opera Omnia*
In his numerous references to Ramos, Burtius generally refers to his former teacher as "the prevaricator of the truth." Compared to some of the other slurs that are directed toward the Spanish theorist by Burtius—"the author of paradoxes," "father of an ox," and "the dung of Spain"—this epithet appears to be quite complimentary. Further characterizations of Ramos, offered by Burtius in the Musices opusculum, employ a host of descriptive adjectives: ignorant, arrogant, conceited, impudent, insolent, mad, irrational, malicious, worthless, crass, contradictory, perverted, and depraved. It appears that Burtius and Ramos did not enjoy the most congenial of relationships; nevertheless, Burtius provides a nearly word-for-word reiteration of many of Ramos's explanations of counterpoint and rhythm in his own Musices opusculum.

---

Johannis Spatarii (Bologna: Antiquae Musicae Italicae Monumenta Bononiensia, 1967), ff. 2v-3r.

6See especially the Prologue of Burtius's Musices opusculum, ff. a2r-a4v.

7Nicolaus Burtius's discussion of rhythm in Chapters 1 and 2 of the Musices opusculum addresses many of the topics that Ramos discusses in Part 3, Treatise 1, Chapters 1-3 of the Musica practica. Burtius does not include all the variant prolational symbols that Ramos demonstrates, preferring to use only O, C, O, and C. See Burtius's, Musices opusculum, Treatise 3, ff. flr-f6r. For further discussion of Burtius's explanations of counterpoint which resemble Ramos's discussions in the Musica practica, see Chapter VIII of this commentary.
For the most part, Spataro's 1491 rebuttal to the *Musices opusculum* of Burtius ended Burtius's attacks upon Ramos. Most of the polemic debates in which Spataro engaged involved the Italian theorist and composer Franchinus Gaffurius. Much of what is known of these debates has been extracted from their respective published works, which also serve as an abundant source of information regarding the controversy between the Bolognese and Milanese schools.

Spataro launched his initial attack against Gaffurius in 1510 by way of an unpublished treatise entitled *Utile e breve regule di canto composte per Maestro Zoanne di Spadari da Bologna.*\(^8\) Spataro's *Utile e breve regule di canto* was largely a reaction to Gaffurius's marginal annotations on the "errors of Ramos" that Gaffurius had inscribed in a copy of the *Musica practica* loaned to him by Spataro.\(^9\) In a letter dated 27 November 1531, Spataro expresses his extreme displeasure for Gaffurius's unsolicited annotations:

I sent it— that is, the *Musica practica* of Bartolomeo Ramis— to Franchino in Milan. Sometime later he sent it back to me all spoiled and annotated with personal

---


\(^9\)Gaffurius's Latin annotations, with English translation, are provided in the endnotes to the translation of the *Musica practica* contained in Part II of this dissertation. Whenever possible, the annotations appear according to Gaffurius's placement in Spataro's copy (the A-80 edition).
remarks against the author's viewpoint. It is [in] such [poor condition] that I really do not care to show it [to anyone], because other people, who do not understand the objectives of the author could easily believe what was written by Franchino. If I were able to find another [copy], I would buy it; and in order not to have these annotations be read [by anyone], I would cast this one that I have into the fire.¹⁰

Gaffurius responded to the Utile e breve regule di canto with a published treatise entitled De harmonia musicorum instrumentorum opus¹¹ (1518), to which Spataro responded by means of eighteen personal letters. It is unfortunate that this particular correspondence between Spataro and Gaffurius is no longer extant; these letters would have provided subsequent generations with a glimpse of the private, informal discussions that took place between two prominent music theorists of the sixteenth century.¹²

¹⁰"Io la scilicet la Musica practica di Bartolomeo Ramis mandai a Milano a Franchino et lui dopo me la mando tuta sesquiternata et de sua mano appostilata contro lo auctore, in modo che non me curo che sia veduta, perché altri, che non intendono li termini de lo auctore, facilmente potranno credere a quello che fu scripto da Franchino; et se io ne trovasse un altra, io la compraria et, perché tale appostille non fussino vedute, io geteria questa che tengo nel foco." See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 228r-229v, a compilation of over 100 letters of famous personages that were collected by Giovanni del Lago. A copy of this letter can also be found in the Bologna, Liceo Musicale MS B107-3, 368-377. The Bologna manuscripts are a collection of seventy-seven letters, forty-eight of which were written by Giovanni Spataro.


¹²Ibid., 20.
Gaffurius's second published attack against Ramos and his disciples appears in the *Apologia Franchini Gafurii Musici adversus Joannem Spatiarium et complices musicos Bononienses* (1520). The title of this treatise is indicative of the type of invective that was exchanged between Spataro and Gaffurius. Here, Gaffurius implies that Spataro is the ringleader of a band of musical "accomplices" in Bologna, as if to suggest that a criminal act had been committed.

Spataro replies to Gaffurius's *Apologia* with his *Errori di Franchino Gafuria da Lodi, da maestro Joanne Spatario, musico Bolognese, in sua defensione, e del suo precettore maestro Bartolomeo Ramis hispano subtilmente dimostrati* and with his *Dilucide et probatissime demonstratione de Maestro Zoanne Spatario musico Bolognese contra certe frivole et vane excusatione da Franchino Gafurio (Maestro de li errori) in luce aducte (both

---


1521), completing his criticism of Gaffurius in his final treatise, entitled *Tractato di musica* (1531).

In addition to Spataro, Ramos found an enthusiastic supporter in the famous Italian theorist and composer Pietro Aaron who, in his *Thoscanello* of 1523, referred to Ramos as "a most estimable musician, truly worthy of veneration by every learned person." Aaron's first treatise, *Libri tres de institutione harmonica* (1516), entangled him in the on-going controversy between Gaffurius and Spataro. During the course of their debates with Gaffurius, Spataro and Aaron developed a close friendship; the amiable letters that were exchanged between Spataro and Aaron provide

---


invaluable insight on the nature of the disputes between Spatzo and Gaffurius.19

Ramos's proposal of a solmization system that contained a single mutation was not only a reaction to the Guidonian hexachord but was a response to the theoretical propositions of the English theorist John Hothby. In the treatise Calliope legale, Hothby advocates the placement of hexachords on all twelve pitches of the chromatic scale. In principal, Ramos concurs that hexachords are indeed possible at other locations than those established by Guido on C, F, and G; however, Ramos criticizes Hothby's insistence upon the employment of Guidonian solmization with the twelve hexachords due to the excessive number of complicated mutations that ensue from such arrangements. Hothby defends his theory, citing the authority of the ancients, in three treatises: Dialogus Johannis Ottobi Anglici in arte musica, Excitatio quaedam musicae artis per refutationem, and the Epistola.20


20See Albert Seay, ed., Johannis Octobi tres tractatuli contra Bartholomeum Ramum, vol. X, Corpus Scriptorum de Musica (Rome: American Institute of Musicology, 1964). The Excitatio is of special interest to the present study; this treatise contains quotations that have been extracted from the Musica practica followed immediately afterwards by Hothby's opposing viewpoints.
In the *Dialogus*, Section V, Hothby takes Ramos to task for his assumption that one can determine the mensuration of a composition without the assignment of a time signature. Hothby's reaction to Ramos's rebuke concerning the "errors of excess" has been repeated by other theorists and musicologists in subsequent centuries; it is a reaction that has resulted from a misunderstanding of Ramos's intentions, derived from an extraction of the following statements from the *Musica practica*:

For there is no real purpose for things to be done by many means which can be done by fewer means.\(^2\)

Therefore, just as those who, lacking foresight, err by defect [when they] decide that the species without any sign is perfect, thus also, those who add another [sign] err by excess, since the perfect can be distinguished by one [sign]. For example, if a rest of a long occupies three spaces within a song, they err who add this sign 0\(^2\); likewise also if two rests of a semibreve are found in this way \(=\), [then] this 0 or this 0 is placed superfluously if minim rests are arranged in this way \(==\); especially if both are found, since otherwise, anyone could say it was placed for the purpose of indicating that which was lacking.\(^2\)

Hothby assumes from these statements that Ramos is advocating the abolishment of mensuration signs. Hothby argues that, if time signatures were really unnecessary, it would follow that all other musical symbols upon which


\(^2\)Ibid., 70.
musicians have come to rely upon might likewise be abolished! Hothby concludes his discussion in the Dialogus with a rhetorical question, asking if a musician could actually understand an entire composition without any written symbols whatsoever.\(^\text{23}\)

Clearly, Ramos was not advocating an abolishment of all the symbols that clarify the perfection and imperfection of a composition. As a theorist with a proclivity for \textit{musica practica}, Ramos demonstrates that one could determine the mensuration by examining merely the values of the rests in a composition, rather than by relying on a multitude of symbols that only complicate matters of mensural notation. Clearly, Hothby's criticism that Ramos sought to abolish all notational symbols is quite absurd and cannot be taken seriously.

\textbf{Conclusion}

The \textit{Musica practica} of Bartolomeo Ramos de Pareia has long been recognized as a significant and controversial cornerstone in the history of music theory. Ramos's innovations with regard to tuning and his proposal that musicians use the octave, rather than the Guidonian hexachord, as a basis for theoretical organization have had a profound and long-lasting impact upon the development of

Western music. Ramos's more "radical" theories served as the source of polemic debate for decades to come, and his disciples—loyal and persistent—succeeded in preserving and transmitting his ideology to future generations.

Several respected twentieth-century musicologists have dismissed Ramos as an inconsequential figure in the development of music theory. This attitude can be attributed primarily to two factors: the lack of an English translation and critical evaluation of the *Musica practica*, and out-of-context translations of fragments that have resulted in both accidental and willful misrepresentations of Ramos's intent.

Upon investigation of the *Musica practica*, it is clear that many of Ramos's contemporaries "borrowed" his ideas without giving him due credit. Ramos's ideas appear, without proper attribution, in the treatises of the most celebrated music theorists of the fifteenth and sixteenth centuries, including Nicolaus Burtius, Pietro Aaron, Ludovico Fogliano, and Gioseffo Zarlino. While it is beyond the scope of this study to thoroughly investigate all the innovations proposed by Ramos, to assess their impact upon the discipline of the history of music theory, and to decipher the real and invented quarrels that ensued among Ramos's supporters and opponents, it is hoped that this translation and critical evaluation of Ramos's *Musica*
practica will facilitate future studies in the history of theory discipline.
CHAPTER II

THE BIOGRAPHY OF BARTOLOMEO RAMOS DE PAREIA

The musical theories of Bartolomeo Ramos de Pareia became widespread across Spain and Italy with the publication of his *Musica practica* (1482); whatever biographical information that may be surmised about the author, however, must be gleaned primarily from the *Musica practica* itself and from correspondence that ensued between two of Ramos's disciples—Giovanni Spataro and Pietro Aaron.

The colophon of the *Musica practica* (A-80) states that Ramos de Pareia was born in Baeza, a small city in the province of Baetica (currently the diocese of Jaén in southern Spain), itself within the jurisdiction of Gienna; the designation "de Pareia," however, remains a mystery. In the foreword to a recent Latin-Spanish translation of the *Musica practica*, Enrique Sánchez Pedrote suggests that the designation "de Pareia" may stem from a patronymic derivation.1 Attempts to uncover a record of Ramos's birth in the archives of Baeza and Jaén, however, have been unsuccessful.

---

The exact date of Ramos's birth remains unknown; based upon the events of his life, however, we are able to surmise an approximate date of birth of 1440. The primary basis for this conjecture is a statement in the Johannis Spadarii musices ac Bartholomei Rami Pareie honesta defensio in Nicolai Burtii Parmensis opusculum (1491), in which Spataro informs us that Ramos spent ten years in writing the Musica practica before its publication in 1482:

Read a little of that profound doctrine of my [teacher] Pareia and you will understand the truth. For ten years had already passed since he had written that book and still he did not wish to publish it. However, the entreaties of his friends have been so enthusiastic that perhaps he will publish the third part.²

Moreover, Ramos himself mentions in the Prologue to the Musica practica that, over a lengthy duration, he had extracted information from the primary treatises of the discipline in order to provide a compendium and summary for the student:

After a long period of many sleepless nights and continual nocturnal studies, I have been able to collect [information] from the readings of the most esteemed authors and from the instruction of the most famous teachers. From this [effort]--as if from some overflowing and general source--one will be permitted with extremely quick and easy study to absorb all

---

²"Legi un poco quella piena doctrina del mio Pareia et intenderai la verita, che za erano diece anni che havea facto quel libro: et anchora non lo voleva porre fora: se non che tanto furono li preghi de li amici, che quasi la terza parte divulgo." Spataro, Honesta defensio, fol. 14.
[these things] and reach the highest pinnacle of music by the most tranquil course.\(^3\)

Having such a familiarity with the theories of both his predecessors and his contemporaries, it is reasonable to assume that Ramos was a mature musician by the publication of the *Musica practica* in 1482 and, consequently, it is reasonable to suggest a birth year of 1440 in the absence of any reliable documentation.

An examination of Ramos's treatise reveals that its author was indeed well-educated. To the credit of the author, much of his knowledge appears to have been self-acquired; he acknowledges only a single teacher—the Spaniard Juan de Monte, "who was the first to instruct me in the rudiments of music . . .,"\(^4\) and whom Ramos elevates to the status of such musical celebrities as Ockeghem, Busnois, and Dufay.\(^5\) The exact dates or duration that Ramos was in contact with Juan de Monte is unknown; what is known is that de Monte was highly respected both as a practicing musician-theorist, and that he served as cantor at the pontifical chapel of Nicolas V between 1447-57.

As one might expect, artistic and literary records provide no information about Ramos's physical appearance.

\(^3\)Ramos de Pareia, *Musica practica*, 1.

\(^4\)"qui fuit primus qui me musices imbuit rudimentis . . ." Ibid., 69.

\(^5\)"Et istud servat Ockeghem, Busnois, Dufai et Johannis de Monte et alii viri in hac facultate famosi." Ibid., 66.
A brief remark by Spataro, however, in response to the sarcastic remarks expressed by Nicolaus Burtius in his *Musices opusculum*, confirms that Ramos was short of stature (this response also gives us a glimpse of Spataro's loyalty and his determination to defend his teacher against even the most inconsequential of criticisms):

By saying that he is a short man, you [Burtius] actually honor him, since the majority of learned men are short rather than tall, and the reason is this: their head is closer to their heart.

Ramos's Tenure at the University of Salamanca

The first professorship of music acquired by Ramos was at the University of Salamanca, a chair that had been established in the thirteenth century by Alfonso X "el Rey Sabio" as the first chair of music in a European university. University records indicate that Ramos held this position for several years, beginning in 1452. The position was

---

6"Condoleo patres ac fratres venerandi de huius homuncionis insulissimi ostentatione et arrogantia omnino deridenda, qui veluti stercus in Hispaniae finibus velit his sanctissimis patribus doctrina, consilio, prudentiamque, nec non et sanctitate praeponi. O insaniam! O verecundiam non ferendum!" Translation: "Venerable fathers and brothers, I feel severe pain on account of the ostentation and complete arrogance of this very silly little man who, as the dung of Spain, desires after death to be placed above these most holy fathers as a result of his teaching, judgment, prudence, and integrity. O how insane! O the unbearable shame [of it all]!" Burtius, *Musices opusculum*, fol. c2v.

7"In quello che tu dici lui esser homo piccolo, li fai grande honore, perchè li homini piccoli sono la magior parte piu docti che li grandi e la ragione e questa: perchè hanno il capo piu appresso al core." Spataro, *Honesta defensio*, fol. 19v.
undoubtedly prestigious, given the fact that Salamanca was one of the most important cultural and humanistic centers in the fifteenth and sixteenth centuries. Music played a prominent role in the academic affairs and traditions at the university.⁸

A royal decree of 1538 established the duties of the professor of music to include addressing the various topics of *musica speculativa* for half the available lecture allotment, with the remaining class time expended on aspects of *musica practica*: plainsong, mensural music, and the writing of counterpoint exercises. These statutes also reveal that lectures in the discipline of music, along with those in astrology and *gramatica de menores*, were not invariably delivered in Latin, but that lectures in the vernacular were acceptable.⁹ Although these statutes were confirmed in 1538 (somewhat later than Ramos's tenure at the university), they provide insight into the academic atmosphere that Ramos must have enjoyed while residing in Salamanca.

The long history of theoretical disputations between Ramos and his contemporaries begins in Salamanca with Pedro Martínez de Osma, a professor of music and theology residing

---


⁹Ibid., 210-12.
at the university from 1463-78. It appears that the source of this particular dispute stemmed from Ramos's lectures on the teachings of Boethius, particularly in regard to the differentia musicae and the implementation of the diatonic, chromatic, and enharmonic genera in modern practice. Evidently, Ramos responded to Pedro de Osma's attacks with his first treatise, written in the vernacular Spanish. This treatise is, unfortunately, no longer extant; proof of its existence, however, stems from a citation in the Musica practica, in which Ramos proudly declares himself to be the victor of the dispute:

However, we have already refuted this publicly in his [Pedro de Osma's] presence when we were doing research in Salamanca, and in the treatise that we published in the mother tongue while on the faculty there. We have contradicted him on everything to such a degree that he himself, after viewing and examining my treatise, said: "I am not as familiar with Boethius as he is."  

---

10Ramos de Pareia, Musica practica, 32. This treatise is also referenced in Book IV Chapter 4 of Pietro Aaron's Lucidario in musica: "Et Bartolomeo Rami in un certo suo compendio composto in lingua materna dice che gli antichi dicevano che il contrapunto o vero organazione non era altro che considerare la consonanza che fanno duoi soni o vero due voci o piu una piu acuta o piu grave dell'altra giuntamente profferite." Translation: "And Bartolomeo Ramis in a certain one of his compendiums written in the mother tongue says that the ancients believed that counterpoint—that is, organum—was nothing other than considering the consonance that two sounds or two voices—either one higher or lower than the other—produce when they are sounded at the same time." Pietro Aaron, Lucidario in musica, vol. LXVIII, Monuments of Music and Music Literature in Facsimile (New York: Broude Brothers Limited, 1978), fol. 18v.
In Pedro de Osma we find a scholar with the true humanistic spirit of intellectual honesty. Shortly after this public debate, Pedro de Osma and Ramos became friends and continued to engage in congenial academic dialogue for many years thereafter. It should be noted, however, that the nature of the dispute between Pedro de Osma and Ramos was quite unlike the malicious polemics that were to later ensue between Ramos and his critics at the end of the fifteenth century.

The dispute with Pedro de Osma was not the only academic challenge for Ramos during his tenure at Salamanca. It appears that Ramos engaged in another debate with Tristan de Silva—a Spanish poet and musician who served at the chapel of the Portuguese king, Alfonso V—regarding the nature of the conjunct and disjunct tetrachord. Despite their disagreement, however, Ramos appears to have a great deal of respect for de Silva, referring to him as "the Spaniard Tristan de Silva—our dearest friend, and a man with the most sagacious talent." Further, in his section on counterpoint in the Musica practica, Ramos cites Tristan de Silva as an authority in matters of employing the diapente and the semidiapente in succession. Even while

---

11Ibid., 12.

12"Tristanus vero de Silva in quinta, ut ait, non prohibetur taliter, quoniam potest fieri quinta post quintam, dum tamen una sit semidiapente, alia vero diapente, sicut reperimus in cantilena Sois emprantis et in alis

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
noting their points of disagreement, Ramos is careful to maintain that such differing points of view do not affect their long-standing friendship. Such is the case in the passage where Ramos discusses Tristan's endorsement of Johannes de Muris's view of perfect and imperfect prolation, an opinion that Ramos perceives as faulty in light of the doctrine of ancient authorities:

And it is not known by all the singers how the perfection or imperfection is distinguished in the prolatio maior, nor [is it known] by some musicians, such as our friend Tristan de Silva, who affirms the vulgar opinion of Johannes de Muris [by] saying: "The prolatio perfecta is major and the [prolatio] imperfecta is minor." We wish to reject this, first with the authority of the ancients and [then] with an example and mathematical demonstration of the progressive moderns.13

As in the case of the debate with de Osma, the dispute between Ramos and de Silva was relatively mild compared to the later attacks that would be made by Burtius, Hothby, and Gaffurius.14

13Ibid., 68.

The only other musician of whom Ramos speaks with such fondness is Johannes de Urrede, a Flemish composer active in Spain during the second half of the fifteenth century who served as Kapellmeister for Ferdinand V. Ramos expresses his high esteem for de Urrede, referring to him as "carissimus noster regis Hispaniae capellae magister." Ibid., 67.
In the epilogue of the *Musica practica*, Ramos refers to a second treatise that he had written in the vernacular during the Salamanca period—the *Introductorium* or *Isagogicon*. Our only knowledge of this document comes from remarks that Ramos himself provides in the *Musica practica*, in which he recommends this treatise to the musician who seeks an easier path in an attempt to avoid the tedious arguments of *musica speculativa*:

But whoever desires to take the true and easy path of this discipline without the obscurity of arguments [and] without the long digressions of demonstrations and disapprobations, let him seek our little music book which we have entitled *Introductorium* or *Isagogicon*. There you will find in abundance the most vital issues of theory [stated] briefly and clearly. And when you wish to fortify those things which you will see there with reasons and consider them in more depth, you will return to this work which [acts] as a refuge and a bulwark for that [other work].

Ramos's growth as a scholar is clearly demonstrated by his authorship of two treatises while residing in Salamanca. His compositions of this period include various canons, a requiem, a mass, and a *Magnificat*; however, only one of these works—a four-voice circle canon—remains extant for examination.

---

15Ramos de Pareia, *Musica practica*, 82.

16See Chapter IX of this commentary for a discussion, facsimile, and transcription of this canon.
Speculations on Ramos's Place of Residence (1472-82)

Ramos eventually left Salamanca for Italy, although the specific reasons for this departure and his location of immediate resettlement are unknown. It is possible that Ramos may have been asked to leave the faculty at the University of Salamanca because of his unpopular theories and the heated debates that were fueled by such theories. Clemente Terni, historian of theory and author of a Spanish translation of the Musica practica, suggests that Ramos may have immediately settled in Naples. Terni bases this argument on the polemics that were directed towards Johannes Tinctoris in the Musica practica; polemics which address the specific theories that were held by Tinctoris and which may have been the result of Ramos's provocative discussions with Tinctoris during his residence in Naples. Terni acknowledges, however, that his evidence is tenuous at best, and speculates that Ramos may have alternatively visited the northern Italian cities of Orvieto, Perusa, and possibly Arezzo--the home of his predecessor and academic adversary, Guido d'Arezzo.¹⁷

Different locales have been proposed for Ramos's place of residency in the period 1472-82. Some historians believe that Ramos was in Bologna as early as 1472, delivering

---

public lectures and completing the first volume of the
Musica practica; others argue that Ramos spent the
Salamanca-Bologna interim in Florence. The latter theory is
based upon: (1) the testimony of Ramos's student, Giovanni
Spataro, who relates that Ramos visited Florence to review
the choral books at the Church of the SS. Annunziata;18 (2)
the appearance of Ramos's four-voice canon Sive lidium in
synēmmenOn in a Florentine codex,19 which includes
illuminations from the Florentine artists Gherado and Monte
di Giovanni del Flora who were active in Florence during the
latter portion of the fifteenth century;20 and (3) John
Hothby's reference to "ipsi quoque Florentini" [Ramos and
his Florentine associates] in the first section of the
Dialogus Johannis Ottobi Anglici in arte musica.21

Previously discussed is the comment by Spataro that
Ramos spent the ten years 1472-82 in writing and editing the
Musica practica. Albert Seay proposes that, because Spataro

18See Spataro, Honesta defensio, fol. 15v.

19Florence, Biblioteca Nazionale Centrale, Banco Rari
229, fol. 3v. See Howard Mayer Brown, ed., A Florentine
Chansonnier From the Time of Lorenzo the Magnificent:
Florence, Biblioteca Nazionale Centrale MS Banco Rari 229,
vol. VII, Monuments of Renaissance Music (Chicago: The
University of Chicago Press, 1983), 16-22 and plate II.

20See Albert Seay, "Florence: The City of Hothby and
Ramos," Journal of the American Musicological Society IX

21See Seay, "The Dialogus Johannis Ottobi Anglici in
arte musica," 91-92.
does not identify the specific city in which Ramos completed the *Musica practica*, it is possible that Ramos finished and circulated the treatise in Florence before his departure for Bologna. The fact that Hothby indirectly (and derogatorily) refers to Ramos and his followers as "these Florentines" is offered as support for this argument. As further evidence, Seay refers to a letter by Hothby that was addressed to a Florentine priest; here Hothby complains about Ramos's disrespect toward him personally, and claims that Ramos's radical theories are accepted by neither the Florentine musical community nor by the rest of the world.

Claude Palisca takes issue with Seay's conclusions in his article on Ramos in *Die Musik in Geschichte und Gegenwart*, proposing that Ramos spent time in Florence after, but not before, his residence in Bologna. Palisca argues that the canon *Sive lidium in synēmenōn* was written after the *Musica practica*, and dismisses Hothby's letter to the Florentine priest as inconsequential evidence, viewing this letter as merely a request that the priest pass along Hothby's reaction to the attacks that were directed against him by Ramos in the *Musica practica*. Palisca believes that the *Musica practica* was, in fact, written in Bologna. He supports this opinion by reference to a remark by Nicolaus Burtius in the *Musices opusculum* in which Burtius states

\[22\text{Magliabechiana XIX, 36, fol. 74. Ibid.}\]
that he lent his copy of a Guidonian manuscript to Ramos in Bologna.\textsuperscript{23} It is suspected that the specific work loaned by Burtius was Guido's Micrologus—a work that Ramos later criticized in his Musica practica.

**Ramos in Bologna**

It is possible that Ramos arrived in Bologna prior to 1482. The colophon to the Musica practica states that Ramos had been presenting public readings about music—for an unspecified period—prior to the publication of the treatise.\textsuperscript{24} There is little doubt, however, that Ramos was living in Bologna by 1482; for this was the year that the Musica practica was published and its colophon clearly identifies Bologna as the city of publication.

The Archivio di Stato di Modena holds a letter from the Bolognese nobleman Floriano Malvezzi to the Duke of Ferrara—Hercules I of Este—that confirms Ramos's lectures on music in 1482. In this letter, Malvezzi refers to Ramos

\textsuperscript{23}"Legisti aliquando private guidonis opusculum: Dum esses bononie: a me prestitum: et a te non intellectum." Translation: "While you were in Bologna you read Guido's little book in private that you borrowed from me, and you did not understand [it]." Burtius, Musices opusculum, fol. a2v.

as "that Spaniard who publicly lectures on music in Bologna." Gaffurius also substantiates Ramos's public readings in Bologna with a comment regarding Ramos's motet *Tu lumen tu splendor patris*:

But your teacher's song *Tu lumen tu splendor patris* (which the illiterate wrote while lecturing publicly in Bologna), enlightened [us] to his practice of the enigmatic canon with an arrangement of the tenor in this succession of the third with the fourth.

Ramos himself affirms his public lectures in Bologna and the composition of his work, *Tu lumen tu splendor patris*, with a brief remark in the *Musica practica*:

But in the motet *Tu lumen* where we have established *In perfectione minimorum per tria genera canitur melorum* (which we composed while we lectured publicly in Bologna), we recommended that any note be worth six measurements by means of syllables designated on lines and spaces . . . .

Ramos was evidently quite satisfied with this motet due to the fact that it could be performed by implementing

---


26 "At cantici ipsius praecceptoris tui *Tu lumen tu splendor patris*, quod, dum Bononias illitteratus tamen publice legeret, adnotavit, tenoris hoc ordine descripti quarto tertii practicae suae enigmatis canonem sic elucidavit." Gaffurius, *Apologia*, fol. 8v. Note that Gaffurius does not miss any chance to demonstrate his disdain for Ramos, here referring to him as "an illiterate."

all three of the genera; not only could it be sung with the
tenor moving diatonically, but chromatically and
enharmonically as well. Gaffurius was less impressed,
however, submitting his opinion that Ramos was "never able
to grasp the true meaning of the chromatic and enharmonic
genera." 28

Spataro asserts that Ramos was drawn to the city of
Bologna in the hope of receiving the chair in music at the
University of Bologna. In anticipation of being offered
such a position, Ramos had written the Musica practica with
plans for two additional volumes. In the Musica practica,
Ramos promises the reader a more thorough explanation of
various topics--topics that were discussed only
superficially in the Musica practica. Ramos pledges to
address the more difficult speculative topics in a
forthcoming Musica theorica and Musica semimathematica;
unfortunately, this tripartite structure was never realized.

The University of Bologna was a logical career
advancement for Ramos. As in other universities of the
time, music at the University of Bologna had previously been
taught by private teachers who collected payment directly
from their students; at the beginning of 1450, however,
Nicholas V established an endowed position in music at the

28 "Inde enigma et canonem ipsum Bartholomaeus
praecipit tuus, quem imitaris non sane disposit neque
ipsorum generum spissorum formalem naturam intellexit."
Gaffurius, Apologia, fol. 9v.
university. Unfortunately for Ramos, this position was soon abolished due to the opposition of the mathematics faculty, who felt that the traditional connection between mathematics and music should not be severed. Realizing that the dream of a salaried position in Bologna would not be realized, and distraught over the mounting controversy created by his *Musica practica*, Ramos prepared to leave the city.

It has been proposed that the date of Ramos's departure from Bologna was after 1484; this date is based upon Spataro's testimony that he possessed a "small treatise" given to him by Ramos in 1484 that was written in his teacher's own handwriting:

That doctrine is not my own; however, I have extracted it from a small treatise that was given to me by my teacher in the year 1484, and that treatise was written by his own hand.29

The date of the post 1484 departure, however, is based upon the assumption that Ramos was actually in Bologna when he gave the treatise to Spataro. It is quite possible that Ramos had already left Bologna by 1484, and that he sent the treatise to Spataro from Rome; it is equally plausible that Spataro may have visited Ramos in Rome and received the treatise at that time.

One can speculate that this "small treatise" may have been an unfinished manuscript of Ramos's proposed *Musica theorica*. Spataro was, in fact, later accused of possessing unpublished works of his master and of using them to strengthen his arguments against his teacher's detractors—an accusation that Spataro strongly denied in a letter to Pietro Aaron dated 13 March 1532:

There have been many who believed that I have his complete treatise, and that I have kept it hidden in order to keep my thefts from being discovered, but I assure you that they are gravely mistaken.30

**Ramos in Rome**

Little is known about Ramos after his departure from Bologna; what little information is known comes from the *Honesta defensio* (1491) in which Spataro relates that Ramos was living in Rome and was enjoying success as a well-respected member of the musical community:

... after he departed from us, appreciation for him grew dramatically ... and you know that he is in Rome now where his merits are recognized more than they were here among us, since very learned men in each and every doctrine come together there. He is esteemed there as master of masters just as, among us, he is well-known by the wisest men of this art whom you ignore.31

---

30"Son stati multi, li quali hano creduto che Io habia tale suo tractato complecto et che Io el tenga oculto, aciochè li mei furti non restino scuperti; ma certamente sono in grande errore." See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 236r-v or Bologna, Liceo Musicale MS B107-3, 399-401.

31"... da poi che lui si parti da nui senza proportione sonno le laude sue cresciute ... e adesso perché tu sai che lui e a Roma, dove assai piu sonno le
The exact date of Ramos's death is unknown. In a letter to Aaron dated 13 March 1532, Spataro provides information regarding the possible reasons that Ramos left Bologna as well as his own theory regarding the cause of his teacher's death:

As far as the work of my teacher is concerned (which you desired to have [in its] entirety and complete), I can tell you for sure that he never finished it, and [even] the one that is available is incomplete. This is due to the fact that he had part of it printed in Bologna, because he believed that he was going to read it in public [for which he would receive] a stipend. Then, because of various reasons, it happened that he did not obtain the public lectureship and he went off to Rome rather angry, taking with him all the printed parts with the intention of delivering them in Rome. However, he never delivered them [there]; for he devoted himself to a lecherous lifestyle which was the cause of his death.32

François Joseph Fétis, in his Biographie Universelle des Musiciens et Bibliographie Générale de la Musique, proposes that Ramos was still alive as late as 1521. Fétis

virtu sue cognosciente che qui fra nui, perche ivi concorreno homini in ciascuna faculta doctissimi: et e tenuto per maestro delli maestri come fra nui e noto da homini sapientissimi in questa da te ignorata arte." Spataro, Honesta defensio, fol. 23r.

32"In quanto a l'opera del mio preceptore, la quale desiderati de haver tuta et complecta, Ve dico certamente che lui ma non dete complemento a tale opera, et quella che se trova non e complecta, perche lui fece stampare a Bologna tale particole, perche el se credeva de legerla con stipendio in publico. Ma in quello tempo acade che per certe cause lui non hebe la lectura publica, et lui quasi sdegnato ando a Roma et porto con lui tute quelle particule impresse con intionne de fornirle a Roma. Ma lui non la fornite mai, ma lui attendeva a certo suo modo de vivere lascivo, el quale fu causa della sua morte." See Rome, Biblioteca Apostolica Vaticana MS 5318, ff. 236r-236v or Bologna, Liceo Musicale MS B107-3, 399-401.
based this assumption upon the premise that Spataro, having published the Errori in that same year, would have mentioned the death of his teacher had such a tragedy occurred.\textsuperscript{33} Spanish historians Higinio Anglés and Enrique Sánchez Pedrote support Fétis in this assumption.\textsuperscript{34} Conversely, Stevenson notes that Gaffurius, in his Apologia (1521), writes that Ramos has "long been dead".\textsuperscript{35} Whether Gaffurius is speaking in the literal or figurative sense cannot, of course, be known with certainty.

Conclusion

The Musica practica is the only extant treatise written by the controversial Spanish theorist, Bartolomeo Ramos de Pareia. Although biographical information about Ramos must be gleaned primarily from private correspondence between Pietro Aaron and Giovanni Spataro, and the on-going controversy between the latter and Franchinus Gaffurius, the treatise itself is rich in content and includes comments upon the teachings of other fifteenth-century theorists.


\textsuperscript{34}See Higinio Anglés's Diccionario de la Música Labor, s.v. "Ramos de Pareja," and Enrique Sánchez Pedrote's introduction to the Latin-Spanish translation of the Musica practica by José Luis Moralejo, 5.

\textsuperscript{35}"... quanquam culpare mortuos leue sit non responsuros ..." Gaffurius, Apologia, fol. a5r. See also Stevenson, Spanish Music in the Age of Columbus, 56.
In the Musica practica, Ramos claims to have written a Spanish treatise concerning his teachings on Boethius at the University of Salamanca as well as a Latin treatise on the fundamentals of music; however, neither treatise is extant. In the Musica practica, Ramos discusses several of his own musical compositions; unfortunately, only the four-voice canon Sive lidium in synæmmenôn has survived. Further evidence of his compositional style would perhaps provide a clearer understanding of his theoretical propositions as well as recognition of his talent as a musician. Perhaps, these lost treatises and compositions may one day be rediscovered to shed further light on this most colorful figure in the history of music theory.
CHAPTER III

THE DIVISION OF THE MONOCHORD ACCORDING TO
BARTOLOMEO RAMOS DE PAREIA

The attacks that were directed toward Ramos personally and toward his theoretical proposals focus primarily upon two propositions: his alteration of traditional Pythagorean tuning and his elimination of the hexachordal system as the organizing framework of Western music theory. Due to its affect upon traditional Pythagorean tuning, Ramos's division of the monochord ultimately required him to abandon the Guidonian hexachordal system. For the fifteenth-century theorist, however, the concept of auctoritas was an issue that demanded respect. Ramos's open disregard for the traditional reverence of the ancients was the insurmountable obstacle that led to the unwillingness, and even inability, of his contemporaries to consider his alternative theories.

In his De institutione musica (sixth century), Boethius provides Western music with its tripartite division of the music discipline and establishes the categories into which musicians would fall well into the Renaissance:

Thus, there are three classes of those who are engaged in the musical art. The first class consists of those who perform on instruments, the second of those who compose songs, and the third of those who judge instrumental performance and song. But those of the class which is dependent upon instruments and who spend their entire effort there--
such as kitharists and those who prove their skill on the organ and other musical instruments—are excluded from comprehension of musical knowledge, since, as was said, they act as slaves. None of them makes use of reason; rather, they are totally lacking in thought.

The second class of those practicing music is that of the poets, a class led to song not so much by thought and reason as by a certain natural instinct. For this reason this class, too, is separated from music.

The third class is that which acquires an ability for judging, so that it can carefully weigh rhythms and melodies and the composition as whole. This class, since it is totally grounded in reason and thought, will rightly be esteemed as musical. That person is a musician who exhibits the faculty of forming judgments according to speculation or reason relative and appropriate to music concerning modes and rhythms, the genera of songs, consonances, and all things which are to be explained subsequently, as well as concerning the songs of the poets.¹

Further, Boethius establishes the hierarchical order of the categories of musicians:

Now one should bear in mind that every art and also every discipline considers reason inherently more honorable than a skill which is practiced by the hand and the labor of an artisan. For it is much better and nobler to know about what someone else fashions than to execute that about which someone else knows; in fact, physical skill serves as a slave, while reason rules like a mistress. Unless the hand acts according to the will of reason, it acts in vain. How much nobler, then, is the study of music as a rational discipline than as composition and performance?²

With respect to the societal role of the theorist, a profound change may be observed in the fifteenth century.

Previously, the theorist was one who considered himself to

¹Anicius Manlius Severinus Boethius, Fundamentals of Music, trans., intro., and notes by Calvin M. Bower, ed. by Claude V. Palisca (New Haven, Conn.: Yale University Press, 1989), 51. See also Boethius, De institutione musica, ed. by Godofredus Friedlein (Lipsiae: Teubneri, 1867), 225.

²Ibid., 50. See also Friedlein edition, 224.
be the guide and critic of the performer; he filled his treatises with speculative theories and wrote primarily for the approval of his academic peers. In a break with tradition, Ramos attempts to bridge the gap between the speculative theorist and the practicing musician. In the Prologue to the *Musica practica*, Ramos forewarns the reader of his emphasis on music as a "practical" discipline, making his intentions quite clear:

> Let no one fear the majesty of philosophy, nor the complexity of arithmetic, nor the digressions of proportions. For here, anyone is able to become a most outstanding and skillful musician—even if he is unskilled in everything—provided that he is willing to devote attention to learning and is not completely destitute of reasoning. For indeed, inasmuch as we have desired to serve intelligence, we have retained the blending of expression and the control of style, so that in these readings the experts will be able to be amply refreshed, the poorly educated will be able to make great progress, and the altogether untrained may be able to be instructed with the greatest of pleasure. We undertake [this work] not so much for the purpose of preparing philosophers or mathematicians here; anyone instructed only with the first rudiments of grammar may understand this our [discourse]. Here, the mouse and the elephant alike can float side by side; Daedalus and Icarus can fly away together.\(^3\)

Here Ramos attempts to bring together the two previously estranged species of the mouse (practicing musician) and the elephant (speculative theorist). Ramos is well-equipped for such a task, for as a speculative theorist and a practicing composer he realizes the necessity of providing instruction that is useful for the performer--the one who will

\(^3\)Ramos de Pareia, *Musica practica*, 1.
ultimately realize speculative theories in the manner of performing compositions.

It is precisely this new understanding of the role and need of the practicing musician that prompted Ramos to present an alternative to the cumbersome ratios of traditional Boethian (Pythagorean) tuning. As acknowledged by James Barbour, Ramos had no intent of thwarting tradition just for the sake of innovation by "nailing his ninety-five theses to the church door"; rather, Ramos sought to make speculative theory more relevant to the practicing musician.

In Part 1, Treatise 1, Chapter 2, Ramos states that his division of the monochord—which ultimately results in a new method of tuning—is rooted in practicality:

The regular monochord is accurately divided by Boethius with numbers and measurement. Although it is agreeable and useful for theorists, it is laborious and difficult for singers to understand. Truly, since we have promised to satisfy both [the theorists and the singers], we will render an extremely easy division of the regular monochord. Let no one think that we came upon it with ordinary labor, inasmuch as we devised it with hard work during many sleepless nights, reading and re-reading the precepts of the ancients and avoiding the error of the modern theorists. Anyone even moderately educated will be able to easily understand it.

---


5 Ramos de Pareia, Musica practica, 4.
Again, near the end of the *Musica practica*, Ramos reiterates his intent to provide a simpler explanation of the monochordal division:

In the first division of our regular monochord we have said that Boethius accurately divided his regular monochord by numbers and measurement. However, for the sake of the inexperienced [singers], we have divided our [monochord] with common fractions by means of a continuous quantity, so that it would not be necessary for the student to have previously learned both arithmetic and geometry; for, without a doubt, he would fall into error, which we have prevented. Indeed, we have said that neither of these things are necessary in order for our doctrine to be understood—provided that [the student] has been thoroughly instructed in the beginning rudiments.\(^6\)

**The Tetrachord and the Three Genera**

An understanding of Ramos's proposed division of the monochord requires a familiarity with the monochordal division espoused by Boethius as well as an understanding of the earlier Greek system, out of which the Boethian system emanated.

The Greek musical system was divided into two components: the Greater Perfect System (GPS) and the Lesser Perfect System (LPS). The GPS consists of a descending scale of two octaves, comprised of four tetrachords (each with a fixed intervallic pattern of tone—tone—semitone) plus an additional note. The tetrachords of the GPS are linked either conjunctly (a *synaphê*, in which the tetrachords share a common pitch) or disjunctly (a

---

\(^6\)Ibid., 76.
diazeuxis, in which the tetrachords are separated by a whole tone) to span the range of an octave plus a seventh. The two-octave scale was made complete by the addition of a pitch one whole tone below the lowest tone of the fourth tetrachord. The highest tetrachord of the GPS was given the designation hyperbolaiōn, followed by the tetrachords—in descending order—diezeugmenōn, mesōn, and hypatōn. The lowest note of the gamut was identified as proslambanomenos, while the other individual notes within the tetrachords were identified both by their tetrachordal encompassment as well as by their relative position within the individual tetrachord (see Table 1).

In Part 1, Treatise 1, Chapter 3 of the Musica practica, Ramos explains the Greater Perfect System according to the (incorrect) description given by Boethius in the sixth century, i.e., from the lowest hypatōn tetrachord to the highest hyperbolaiōn tetrachord. This reversal is wholly in accordance with Boethius's transmission of the GPS, brought about by Boethius's misunderstanding of Greek theory.

Likewise, both Boethius and Ramos reverse the order of the Lesser Perfect System. The Lesser Perfect System (LPS) consisted of three conjunct tetrachords with the addition of proslambanomenos in the lowest position. The LPS differed from the GPS by the absence of the tetrachord hyperbolaiōn, and by the substitution of a conjunct synēmmenōn tetrachord.
### TABLE 1

THE GREATER PERFECT SYSTEM
ACCORDING TO BOETHIUS

<table>
<thead>
<tr>
<th>Tetrachord</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypatôn</strong></td>
<td>T</td>
<td>S</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>conjunct</td>
<td>synaphê</td>
<td>e</td>
<td>c</td>
<td>d</td>
<td>T</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mesôn</strong></td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>disjunct</td>
<td>diazeuxis</td>
<td>b</td>
<td>g</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diezeugmenôn</strong></td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>conjunct</td>
<td>synaphê</td>
<td>e^1</td>
<td>c^1</td>
<td>d^1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hyperbolaiôn</strong></td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
</tbody>
</table>

for the disjunct diezeugmenôn tetrachord. The synêmmenôn tetrachord (a, b, c, d) results in a fixed intervallic pattern of semitone--tone--tone. Table 2 illustrates the arrangement of the tetrachords in the Lesser Perfect System.
### TABLE 2
THE LESSER PERFECT SYSTEM
ACCORDING TO BOETHIUS

<table>
<thead>
<tr>
<th>Tetrachord</th>
<th>A</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypatōn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conjunct</td>
<td>B</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>T</td>
</tr>
<tr>
<td>Mesōn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conjunct</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>g</td>
<td>T</td>
</tr>
<tr>
<td>Synēmmenōn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conjunct</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>c¹</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>d¹</td>
<td>T</td>
</tr>
</tbody>
</table>

Proslambanomenos
Hypatē Hypatōn
Parhypate Hypatōn
Lichanos Hypatōn
Hypatē Mesōn
Parhypate Mesōn
Lichanos Mesōn
Mesē
Trite Synēmmenōn
Paranētē Synēmmenōn
Nētē Synēmmenōn

In Greek theory, the GPS and LPS were combined through the addition of the tetrachord *synēmmenōn* to the Greater Perfect System, creating a fusion called *ametabolōn* (immutable). Ramos disapproved of his contemporaries employing the Immutable System; he felt it was contrary to the descriptions that were provided by Boethius and therefore, unacceptable. In Part 1, Treatise 1, Chapter 5 of the *Musica practica*, Ramos admonishes his friend Tristan de Silva for his employment of the Immutable system that uses the five tetrachords *hypatōn, mesōn, diezeugmenōn,*
synēmmenōn, hyperbolaiōn, and for his misunderstanding of the conjunct and disjunct nature of the synēmmenōn and diezeugmenōn tetrachords:

Truly, it was discussed and demonstrated above that the synēmmenōn tetrachord is conjunct but the diezeugmenōn [tetrachord] is disjunct. However, some [people] being ignorant of this (as we have found in a long dispute with the Spaniard Tristan de Silva—our dearest friend, and a man with the most sagacious talent) establish the diezeugmenōn [tetrachord] after they reach mesē. After this, they place the synēmmenōn [tetrachord], [and] then the hyperbolaiōn. And thus, they cause the nētē hyperbolaiōn to stand apart from the prosλambanomenos by [the distance of] three strings beyond a bisdiapason, which is clearly contrary to the truth and the teaching of Boethius.7

Likewise, Ramos criticizes Marchettus de Padua for the employment of an Immutable System that merely adds the synēmmenōn tetrachord to nētē hyperbolaiōn by conjunction and for the appendage of two additional pitches:

Indeed, I do not doubt that [Marchettus] may be saved, since Christ on the cross prayed for those who know not what they do. A certain brother—the Frenchman Johannes Carthusiensis—saves him by saying that he is "both untrained and deserving of chastisement." However, I value this Marchettus so much that I have no doubt that four marchetti could be swallowed down together in one gulp by the Frenchman Roger Caperon . . . . And thus, sinking into the error of others, [Roger Caperon also] establishes [a total of] twenty strings.8

It is surprising that Ramos attacks Marchettus with such vehemence, for Marchettus, unlike Tristan de Silva, continued to preserve the conjunct and disjunct character of these tetrachords. Here, however, we see Ramos following

7Ibid., 12.
8Ramos de Pareia, Musica practica, 12-13.
the mandates set down by Boethius, preserving the Greater Perfect System of fifteen pitches and the Lesser Perfect System of eleven. Ramos was appalled by Marchettus's use of the Immutable System and by his extension that incorporated twenty notes by the addition of the pitch $f$ at the bottom of the gamut and the pitch $e^2$ at the top.

In Greek theory, the inner two notes of each tetrachord could be altered to effect a "modulation" by means of three different genera--diatonic, chromatic, and enharmonic. The two outer notes of the tetrachord were considered "immovable" and thus provided tetrachordal stability for the variable inner notes.

The "diatonic" genus of the tetrachord is comprised of a semitone followed by two tones ($E F G A$), the "chromatic" genus of two semitones plus a semiditone of some sort ($E F F^# A$), and the "enharmonic" genus of two quarter tones plus a ditone ($E E^* F A$).\(^9\) In this regard, Ramos follows Boethius's discussion in Book I, Chapter 23 of *De institutione musica*, which contains an explanation and illustration of the use of the three genera and from which the three scales of the diatonic, chromatic, and enharmonic genera are generated.\(^10\) Theorists typically recognized six

\(^9\)The asterisk symbol denotes the raising of a note by a quarter tone.

\(^10\)Boethius, *Fundamentals of Music*, 43. See also Friedlein edition of *De institutione musica*, 216-17.
variants or "shades" of the genera, that is—two diatonic, three chromatic, and one enharmonic; however, for the purposes of this study a discussion of their most typical forms will suffice.

In his comprehensive survey of monochord division, Cecil Adkins proposes that "within limits, the upper interval in the enharmonic and chromatic genera and the upper two intervals in the diatonic seem to be the real determinants of genus." Adkins confirms his assertion with a discussion of J.F. Mountford's article, "The Musical Scales of Plato's Republic," which demonstrates that the two most common variations of the diatonic genus (256:243 x 9:8 x 9:8; or 16:15 x 9:8 x 10:9) result in the whole tone ratios of 9:8 and 10:9, while the three possible variations of the chromatic genus (28:27 x 15:14 x 6:5; or 28:27 x 243:224 x 32:27; or 22:21 x 12:11 x 7:6) focus recurrently upon the pure minor third of 6:5, and finally, the tetrachordal division of the enharmonic genus (28:27 x 36:35 x 5:4) results in the pure major third of 5:4.

Ramos believed that the three genera had been abused by contemporary theorists and sought to resurrect their correct use by means of his own theories. Examination of

\[11\] See Cecil Dale Adkins, "The Theory and Practice of the Monochord" (Ph.D. diss., State University of Iowa, 1963), 43.

Ramos's division of the monochord demonstrates that Ramos did, in fact, implement the "real determinants" of the genera in his tuning by employing the pure major third (5:4), the pure minor third (6:5), and the two different whole tones (10:9 and 9:8).

**Pythagorean Tuning**

To comprehend the radical innovations that resulted from Ramos's division of the monochord, an understanding of both the authority and mechanics of Pythagorean tuning is required. The tuning that was attributed to Pythagoras (fifth century B.C.) had enjoyed a long-standing and unchallenged tradition throughout the Middle Ages and well into the Renaissance until the new emphasis upon practicality initiated its decline. Due to the simplicity of its application on the monochord, Pythagorean tuning had retained its popularity among speculative theorists who revelled in concrete evidence; practicing musicians, however, preferring the sound of pure intervals and contending on a daily basis with the ever-increasing use of musica ficta, eventually rejected Pythagorean tuning in favor of alternative and more "practical" tunings.

Pythagorean tuning is based upon a preponderance of perfect fifths (3:2). Beginning on the pitch F and continuing in a series of perfect fifths (i.e., F c g d\textsuperscript{1} a\textsuperscript{1} e\textsuperscript{2} b\textsuperscript{2}), Pythagorean tuning can generate seven pitches that
can subsequently be combined into a single octave scale. An alternative demonstration of the scale occurs through the superparticular ratios of the numbers from one to four, which are used to designate the consonances of the perfect octave (2:1), the perfect fifth (3:2), and the perfect fourth (4:3). This method was especially useful for demonstrating the ratios upon the monochord, because the remaining pitches of the system could be deduced by calculating the differences between these various intervals. Table 3 illustrates such a deduction of the various intervals, while Table 4 demonstrates the formation of the Pythagorean diatonic scale by means of five whole tones (each possessing a 9:8 ratio) and two semitones (each possessing a ratio of 256:243).

The necessity for temperament, or the slight adjustment for "purer" tunings in instrumental music, is a consequence of the enharmonic discrepancy that occurs in a series of pure intervals. The generation of three pure major thirds, for example, fall short of a pure octave by the lesser diesis--approximately one-fifth of a whole tone (41.1 cents); the generation of four pure minor thirds exceed the pure octave by the greater diesis (62.6 cents); the generation of twelve pure fifths result in the
**TABLE 3**

THE DEDUCTION OF THE PYTHAGOREAN RATIOS FROM THE DIFFERENCES OF THE INTERVALS

<table>
<thead>
<tr>
<th>Perfect 8ve (2:1)</th>
<th>Perfect 5th (3:2)</th>
<th>=</th>
<th>Perfect 4th (4:3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect 5th (3:2)</td>
<td>Perfect 4th (4:3)</td>
<td>=</td>
<td>Whole Tone (9:8)</td>
</tr>
<tr>
<td>Perfect 4th (4:3)</td>
<td>2 Whole Tones (9:8)</td>
<td>=</td>
<td>Diatonic Semitone (256:243)</td>
</tr>
<tr>
<td>Perfect 4th (4:3)</td>
<td>Whole Tone (9:8)</td>
<td>=</td>
<td>Minor 3rd (32:27)</td>
</tr>
<tr>
<td>Minor 3rd (32:27)</td>
<td>Whole Tone (9:8)</td>
<td>=</td>
<td>Minor Semitone (256:243)</td>
</tr>
<tr>
<td>Whole Tone (9:8)</td>
<td>Minor Semitone (256:243)</td>
<td>=</td>
<td>Major Semitone (2187:2048)</td>
</tr>
<tr>
<td>Major Semitone (2187:2048)</td>
<td>Minor Semitone (256:243)</td>
<td>=</td>
<td>Comma (531441:524288)</td>
</tr>
</tbody>
</table>

**TABLE 4**

THE PYTHAGOREAN DIATONIC SCALE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

---

Pythagorean comma (an enharmonic difference of 23.5 cents).  

Although the octave, fifth, and fourth are "pure" in Pythagorean tuning, the disadvantage of this system becomes apparent in the practical employment of thirds; these are not only "impure," but are considerably "sharp." The sum of four perfect fifths above the pitch C, for example, will produce an E whose ratio is 81:64 rather than the pure third 5:4. The discrepancy inherent in the difference between these two ratios—the syntonic comma—subsequently became a source of dispute between those theorists who preferred the pure fifths of Pythagorean tuning and those who subscribed to alternative tunings that allowed for pure thirds and sixths.

**Traditional Applications of the Monochord**

The monochord was used by the Greeks as early as sixth century B.C. to test the mathematical ratios of musical acoustics. Although this device figures significantly in the history of music theory, its actual construction is quite unpretentious:

---

A device consisting of a single string stretched over a long wooden resonator to which a movable bridge is attached so that the vibrating length of the string can be varied.\textsuperscript{15}

By the time of the Renaissance, the monochord had assumed three primary functions in the disciplines of speculative and practical theory: (1) to visually and audibly demonstrate intervallic proportions; (2) to aid and instruct singers in the study of intonation through the comparison of various intervals; and (3) to serve theorists in experiments with new methods of tuning and in their application to the construction of new instruments.\textsuperscript{16}

Adkins explains that three basic acoustical systems can be applied to the monochord: (1) a proportional system that is a result of the manual division of the monochord—a division in which a "linear mechanical operation" is utilized with a single, tensioned string; (2) a system utilizing various string lengths to effect a comparison of the pitches; and (3) a system of "cents"—a nineteenth-century measurement of one one-hundredth of a semitone that provides a constant for the comparison of various intervals.\textsuperscript{17} Because Ramos proposes a manual division,


\textsuperscript{16}Adkins, "The Theory and Practice of the Monochord," 192-93.

\textsuperscript{17}Ibid., 12-17.
this discussion focuses upon the aspects inherent to the first category; measurement by cents, however, will be used to clarify discrepancies between the Pythagorean division of the monochord and the division proposed by Ramos.

Adkins further notes that the monochord division is discussed in terms of either sub-superparticular or superparticular proportions. A division that compares the sound of the total length of the string (the lowest pitch) to a higher stopped note produces sub-superparticular proportions (e.g., 8:9, 2:3, etc.), whereas a division that compares the sound of a stopped note (usually two octaves above the fundamental pitch) to another stopped note below this pitch produces superparticular proportions (e.g., 9:8, 3:2, etc.). Thus, an "ascending division" occurs by means of the sub-superparticular proportions that arise from lower- to higher-sounding pitches through the employment of increasingly shorter portions of the string, whereas a "descending division" occurs by means of the superparticular proportions that result from the employment of increasingly longer portions of the string from higher- to lower-sounding pitches.\(^{18}\)

**Ramos's Division of the Monochord**

Ramos's monochordal division is based upon the Boethian ascending division. At the beginning of the *Musica*

\(^{18}\)Ibid., 19-24.
practica, Ramos describes a monochordal division that provides the seven notes of what is essentially a two-octave A natural minor scale notated with the letters A–P. It should be noted that Ramos includes the pitch B♭ even in this simple division of the monochord. Later, in Part 1, Treatise 2, Chapter 5, he provides those notes that are needed to complete the chromatic scale (C♯, E♭, F♯, and A♭).

Ramos's division of the monochord results in sub-superparticular proportions; Ramos is not, however, particularly conscientious in his description of these proportions. In Part 3, Treatise 1, Chapter 3, Ramos discusses the relationships of the sounds produced by the entire string in comparison to increasingly shorter portions, i.e., in comparison to higher stopped notes. In this discussion, Ramos incorrectly describes these proportions as "superparticular" rather than "sub-superparticular." This oversight does not affect the sound of the pitches; it may, however, prove confusing for those concerned with the speculative aspects of his division. The technique of an ascending or descending derivation is not a significant matter for Ramos. Although his step-by-step method proposes an ascending division, he notes that one can either compare the high sound to the low sound or vice-versa, and that this option will not make a difference in pitch:
Let the stretched string be struck in its entire length and let the sound be noted. Then, let the finger, or something else more accurate and indeed not very wide, be placed above [the string] and again let the string be struck: the result will be that it emits a considerably higher sound. And when you will have considered a comparison of the higher sound with the low sound or, if you prefer, the lower sound with the high sound, you will perceive the distance to be that of a tone.\textsuperscript{19}

As previously mentioned, Ramos's division of the monochord does not appear to be an attempt to effect a new system of tuning; rather, it is the result of his avid interest in providing a simpler division for the practicing musician, and possibly of an attempt to reflect the type of ratios that were actually being sung by the performers of his time. While Ramos may not have intended to create a new tuning, a new tuning was, in fact, advanced by Ramos in the Musica practica—a treatise that contains the first published explanation of a complete system of just intonation. The New Harvard Dictionary of Music defines just intonation in the following manner:

Any tuning that incorporates five or more acoustically pure types of interval within the octave; in the case of diatonic or chromatic scales, those based on acoustically pure major thirds and acoustically pure fifths.\textsuperscript{20}

\textsuperscript{19}Ramos de Pareia, Musica practica, 5.\textsuperscript{20}

\textsuperscript{20}The New Harvard Dictionary of Music, s.v. "Just intonation."
Ramos's monochordal division results in pure perfect octaves, fifths, and fourths, pure major and minor thirds, and pure major and minor sixths.\textsuperscript{21}

In the \textit{Errori di Franchino Gafurio da Lodi}, Giovanni Spataro responds to Gaffurius's remark that the syntonic comma (the difference between the Pythagorean third and the pure major third, i.e., 21.5 cents) is imperceptible--an argument used by many theorists to justify their retention of the Pythagorean tuning.

\ldots the more you try to criticize Bartolomé Ramos, my master, the more you get enmeshed and show clearly your ignorance, small knowledge, malice, and obstinacy. \ldots Bartolomé Ramos has said that (only in practice, that is in musical usage and activity) the ditone corresponds to the 5/4 ratio, but not in speculative music, \ldots where the ditone corresponds to the ratio 81/64 \ldots the 81/80 ratio [the syntonic comma] (which is the difference between the Pythagorean intervals and the intervals used by experienced musicians is audible—not imperceptible as in your above-mentioned chapter you have concluded. For were it not appreciable, the harsh Pythagorean monochord would not [have to] be reduced, smoothing [it] to the sense of hearing \ldots Bartolomé Ramos [also] judged that the difference is perceptible between the 6/5 minor third and the minor third corresponding to the 32/27 ratio, because otherwise it would be self-defeating to add the

\textsuperscript{21}Although Ramos was the first to publish a complete tuning that incorporated these intervals as pure entities, he cannot be awarded credit as the first theorist to propose the use of pure thirds. As early as 1275, Walter Oddington notes in his \textit{De speculatione musicæ} that singers were using the pure thirds of 5:4 and 6:5 more often than the tertian ratios of 81:64 and 32:27 extracted from Pythagorean tuning. See Hugo Riemann, \textit{History of Music Theory: Polyphonic Theory to the Sixteenth Century}, trans. with preface, commentary, and notes by Raymond H. Haggh (Lincoln, Nebraska: University of Nebraska Press, 1966; reprint, New York: Da Capo Press, 1974), 94-99.
81/80 interval in order to reduce the musical intervals from harshness to smoothness.22

Comments from the late fifteenth century—such as that of Gaffurius in the Practica musicae (1496) regarding participata (the tempering of intervals)—suggest that the properties of tuning and intonation were gradually becoming more of an aural consideration governed by the practicing musician, rather than a speculative issue. Although Gaffurius advocated the Pythagorean third of 81:64 rather than the pure major third of 5:4, he was not completely inflexible to alterations in Pythagorean tuning. While quite apart from Ramos on the matter of specific tuning

---

procedures, Gaffurius was, in fact, probably the first theorist to suggest the concept of temperament:

Nevertheless, the fifth itself, so organists assert, leniently sustains a diminution of a very small and hidden and somewhat uncertain quantity which indeed is referred to by them as *participata*.\(^{23}\)

In this regard, Barbour notes that the organs which were tuned according to Gaffurius's instructions were probably closer to equal temperament than to either just intonation or meantone temperament; for when a Pythagorean fifth of 702 cents is tempered by a "very small and hidden quantity," it could easily approximate 700 cents—the size of the perfect fifth in equal temperament.\(^{24}\)

In addition to a new type of "pure" third, Ramos's division of the monochord results in a tuning that requires two types of whole tones—in ratios of 9:8 and 10:9—to replace the single 9:8 whole tone of Pythagorean tuning. Barbour calls attention to the fact that the ratios of just intonation result from a combination of Ptolemy's syntonic-diatonic tuning and Didymus's diatonic arrangement of the monochord.\(^{25}\) Indeed, an examination of Ramos's diatonic arrangement of the monochord applied to a C major scale

\(^{23}\)"Tamen quinta ipsa (quod organistae asserunt) minimae ac latentis incertaeque quodammodo quantitatis diminutionem patienter sustinet quae quidem ab ipsis participata vocatur." Book III, Chapter 3, Rule 2, Gaffurius, *Practica musicae*, fol. ddllr.

\(^{24}\)Barbour, *Tuning and Temperament*, 5-6.

\(^{25}\)Ibid., 21.
reveals that Ramos's tuning employs the ratios of Didymus's diatonic tuning in the lower diatessaron from the pitches C-F, and Ptolemy's syntonic-diatonic tuning in the upper diapente from the pitches F-C. A comparison of Tables 5, 6, and 7 demonstrates these similarities.

<table>
<thead>
<tr>
<th>TABLE 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIDYMUS'S DIATONIC TUNING</td>
</tr>
<tr>
<td>APPLIED TO THE C MAJOR SCALE</td>
</tr>
<tr>
<td>10:9 9:8 16:15 10:9 9:8 9:8 16:15</td>
</tr>
<tr>
<td>C  D  E  F  G  A  B  C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTOLEMY'S SYNTONIC-DIATONIC TUNING</td>
</tr>
<tr>
<td>APPLIED TO THE C MAJOR SCALE</td>
</tr>
<tr>
<td>9:8 10:9 16:15 9:8 10:9 9:8 16:15</td>
</tr>
<tr>
<td>C  D  E  F  G  A  B  C</td>
</tr>
</tbody>
</table>
Initially, Ramos describes a "diatonic" tuning of the monochord; somewhat later, in Part 1, Treatise 2, Chapter 5, Ramos provides a "chromatic" tuning with the addition of the necessary coniunctae (accidentals).

Table 8 illustrates the ratios that result when these additional coniunctae are applied to a chromatic scale beginning on C.

<table>
<thead>
<tr>
<th>TABLE 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAMOS'S DIATOMIC DIVISION OF THE MONOCHORD</td>
</tr>
<tr>
<td>APPLIED TO THE C MAJOR SCALE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10:9</th>
<th>9:8</th>
<th>16:15</th>
<th>9:8</th>
<th>10:9</th>
<th>9:8</th>
<th>16:15</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>THE CHROMATIC SCALE</td>
</tr>
<tr>
<td>ACCORDING TO PYTHAGOREAN TUNING</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>C#</th>
<th>D</th>
<th>Eb</th>
<th>E</th>
<th>F</th>
<th>F#</th>
<th>G</th>
<th>A#</th>
<th>A</th>
<th>Bb</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cents:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

For a thorough explanation of the various meanings of this term coniunctae, see Chapter VI of this commentary.

Barbour, Tuning and Temperament, 90.
Barbour, however, notes that the series of pitches in perfect fifths from D to C♯ (D, A, E, B, F♯, C♯) lie a comma lower in Ramos's division than those brought about by Pythagorean tuning (see Table 9).^28

### TABLE 9

THE CHROMATIC SCALE
ACCORDING TO RAMOS'S DIVISION OF THE MONOCHORD^29

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>C♯</th>
<th>D</th>
<th>Eb</th>
<th>E</th>
<th>F</th>
<th>F♯</th>
<th>G</th>
<th>Ab</th>
<th>A</th>
<th>Bb</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cents:</td>
<td>0</td>
<td>92</td>
<td>182</td>
<td>294</td>
<td>386</td>
<td>498</td>
<td>590</td>
<td>702</td>
<td>792</td>
<td>884</td>
<td>996</td>
<td>1088</td>
<td>1200</td>
</tr>
<tr>
<td>0</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* (-1 = pitches a comma lower than Pythagorean ratios)

---

^28Ibid., 89-90. Barbour's tables correctly illustrate his intended premise. His text, however, contains two errors: (1) the six notes "lie a comma higher" [sic., lower] than the corresponding notes of the Pythagorean scale; (2) the six notes that lie a comma lower are pitches in a series of perfect fifths from D-C♯, not D-F♯ as Barbour incorrectly states in the text.

^29Ibid.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Conclusion

Ramos's division of the monochord results in the essential intervals of the three genera, i.e., the two whole steps of 9:8 and 10:9 indigenous to the diatonic genus, the minor third ratio of 6:5 from the chromatic genus, and the major third ratio of 5:4 from the enharmonic genus. An ardent disciple of Boethius, Ramos was justifiably proud of the fact that his division of the monochord incorporated the three genera in modern practice. The desire to prove that these genera could be used in modern practice may have been one of the reasons that Ramos was so insistent on creating a monochordal division with these ratios.

Ramos's method of tuning paved the way for the monumental changes in harmonic practice that were to be realized in the succeeding generation. Ramos's division of the monochord—which utilizes pure thirds and sixths—not only laid the foundation for Ramos's other controversial theories, but served as the framework for the tertian-based harmonic system espoused by the sixteenth-century theorist Gioseffo Zarlino.
CHAPTER IV

THE APPLICATION AND EVALUATION OF THE MONOCHORD
ACCORDING TO THE DIVISION PROPOSED BY
BARTOLOMEO RAMOS DE PAREIA

In the final chapter before the epilogue to the *Musica practica*, Ramos categorizes those intervals which are pleasing to the ear and those which should be avoided. This discussion clearly demonstrates the mathematical ratios of which Ramos approved and disapproved, for he meticulously assigns "good" and "bad" values to each of them.

Ramos's division of the monochord results in three types of semitones: a "diatonic" semitone (16:15, 112 cents) that is the difference between the perfect fourth and the pure major third (4:3 - 5:4); a "chromatic" semitone (135:128, 92 cents) that is the difference between the whole tone and the diatonic semitone (9:8 - 16:15); and a "Pythagorean diatonic" semitone, also referred to as the limma (256:243, 90 cents), that is the difference between the perfect fourth and two whole tones (4:3 - (9:8)^2).

While several theorists have noted that Ramos fails to mention that his division necessitates the use of the Pythagorean diatonic semitone, this must not be construed as an oversight by the author. Ramos did not propose a tuning system with the intent of discarding all Pythagorean ratios;
rather, his system was offered as a refinement that attempted to explain contemporary practice. It should further be noted that Ramos's chromatic semitone differs from the Pythagorean diatonic semitone by merely 2 cents (the schisma).

A small discrepancy from traditional terminology results when Ramos refers to the chromatic semitone, or apotome, as the "major semitone."¹ In the Pythagorean system, the chromatic semitone (114 cents)—larger than the diatonic semitone of 90 cents—is labeled the "major semitone"; conversely, Ramos's diatonic semitone (112 cents) is actually larger than his chromatic semitone (92 cents). Thus, Ramos's designation of the chromatic semitone as the "major semitone" seems inappropriate. To avoid confusion, and because their mathematical ratios actually correspond in this manner, Ramos's chromatic semitone will hereafter be referred to as the "minor semitone" while his diatonic semitone will be referred to as the "major semitone." Table 10 illustrates the application of Ramos's semitonal ratios in a chromatic scale beginning on C, as well as Ramos's designations of "good" and "bad" semitones.

¹See Ramos de Pareia, Musica practica, 13.
TABLE 10
EVALUATION OF SEMITONES IN CENTS
ACCORDING TO RAMOS'S DIVISION

<table>
<thead>
<tr>
<th>good</th>
<th>bad</th>
<th>bad</th>
<th>good</th>
<th>good</th>
<th>good</th>
</tr>
</thead>
<tbody>
<tr>
<td>90c</td>
<td>92c</td>
<td>92c</td>
<td>90c</td>
<td>112c</td>
<td>112c</td>
</tr>
</tbody>
</table>

C C♯ D E♭ E F F♯ G A♭ A B♭ B C

bad good good good bad bad

Type of semitone:
C P D C D C D P C D C D

** (C = chromatic, D = diatonic, P = Pythagorean)

Ratios: 90c = 256:243, 92c = 135:128, 112c = 16:15

Ramos obtains the two types of whole tones (9:8 and 10:9) by incorporating the possible combinations of semitones that result from his division of the octave. The major semitone plus the minor semitone produces the major whole tone (112 + 92 = 204 cents, 9:8); the minor semitone plus the Pythagorean limma produces the minor whole tone (92 + 90 = 182 cents, 10:9).

In his evaluation of the resulting whole tones, Ramos designates all of the major and minor whole tones as "good," but disapproves of the whole tones that are located between C♯-Eb and F♯-A♭. This evaluation seems odd in light of the
fact that these "bad" whole tones are valued at 202 cents—only a schisma in difference from the major whole tone of 204 cents. Conversely, Ramos unconditionally accepts the minor whole tones of 182 cents that hold a difference of the syntonic comma (22 cents)! The possible answer to this paradox may stem from the fact that Ramos bases his evaluation upon the specific notation of these intervals, accepting all whole tones spelled as major seconds but rejecting those spelled as diminished thirds. Table 11 demonstrates Ramos's evaluation of the whole tones and their corresponding ratios in cents.

**TABLE 11**

EVALUATION OF WHOLE STEPS IN CENTS
ACCORDING TO RAMOS'S DIVISION

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F$</th>
<th>Ab</th>
<th>Bb</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>182</td>
<td>1</td>
<td>-</td>
<td>204</td>
<td>-</td>
<td>204</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>good</td>
<td>good</td>
<td>bad</td>
<td>good</td>
<td>good</td>
<td>good</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>C$</th>
<th>Eb</th>
<th>F</th>
<th>G</th>
<th>A</th>
<th>B</th>
<th>C$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>202</td>
<td>1</td>
<td>204</td>
<td>204</td>
<td>182</td>
<td>204</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>bad</td>
<td>good</td>
<td>good</td>
<td>good</td>
<td>good</td>
<td>good</td>
<td>good</td>
</tr>
</tbody>
</table>

Ratios: 182$c = 10:9, 204$c = 9:8, 202$c = 9:8 - schisma
Likewise, in his discussion of "good" and "bad" semiditones, Ramos accepts the pure minor third (316 cents) and the Pythagorean semiditone (294 cents), but rejects the three semiditones located between $E_b-F\$, $A_b-B$, and $B_b-C\$, even though these particular semiditones are only a schisma greater than the Pythagorean semiditone. According to Ramos, all semiditones are "good" except where there is a mixture of one "accidental order" (a mixture of flats and sharps) with another.\(^2\) Semiditones that are notated as minor thirds are acceptable; those that are notated as augmented seconds are unacceptable. Table 12 demonstrates Ramos's evaluation of the semiditones and their corresponding ratios in cents.

As in the case of the semiditone, it is again this difference of a schisma that leads Ramos to label particular ditones as unacceptable. In his monochordal division, Ramos considers those ditones which are notated as diminished fourths ($C\#-F$, $E-A_b$, $F\#-B_b$, and $B-E_b$) and which hold the value of 406 cents to be objectional; conversely, the pure major third (386 cents) and the Pythagorean ditone (408 cents) that are notated as major thirds are acceptable. Table 13 demonstrates Ramos's evaluation of the ditones and their corresponding ratios in cents.

\(^2\)Ibid., 79.
TABLE 12

EVALUATION OF SEMIDITONES IN CENTS
ACCORDING TO RAMOS'S DIVISION

<table>
<thead>
<tr>
<th>C</th>
<th>Eb</th>
<th>F♯</th>
<th>A</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>294</td>
<td>296</td>
<td>294</td>
<td>316</td>
</tr>
<tr>
<td>good</td>
<td>bad</td>
<td>good</td>
<td>good</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C♯</th>
<th>E</th>
<th>G</th>
<th>B♭</th>
<th>C♯</th>
</tr>
</thead>
<tbody>
<tr>
<td>294</td>
<td>316</td>
<td>294</td>
<td>296</td>
<td></td>
</tr>
<tr>
<td>good</td>
<td>good</td>
<td>good</td>
<td>bad</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>F</th>
<th>A♭</th>
<th>E</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>316</td>
<td>294</td>
<td>296</td>
<td>294</td>
<td></td>
</tr>
<tr>
<td>good</td>
<td>good</td>
<td>bad</td>
<td>good</td>
<td></td>
</tr>
</tbody>
</table>

Ratios: 294¢ = 32:27, 296¢ = 32:27 + schisma, 316¢ = 6:5

The most interesting discrepancy in Ramos's discussion of acceptable and unacceptable intervals occurs in his evaluation of the perfect fifths and perfect fourths. One of the major defects of both Pythagorean tuning and just intonation is the appearance of a perfect fifth—a "wolf fifth"—that is noticeably out-of-tune in relation to the other fifths. In a Pythagorean tuning on C, the wolf fifth occurs between the pitches G♯-Eb; the problem of the wolf fifth is somewhat mitigated, however, by the fact that the
### TABLE 13

**EVALUATION OF DITONES IN CENTS ACCORDING TO RAMOS'S DIVISION**

<table>
<thead>
<tr>
<th></th>
<th>bad</th>
<th>good</th>
<th>good</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>406</td>
<td>386</td>
<td>408</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>C$</th>
<th>E</th>
<th>F</th>
<th>Ab</th>
<th>A</th>
<th>C</th>
<th>C$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>406</td>
<td>386</td>
<td>408</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>bad</td>
<td>good</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>good</th>
<th>good</th>
<th>bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>408</td>
<td>386</td>
<td>406</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>D</th>
<th>Eb</th>
<th>F$</th>
<th>G</th>
<th>Bb</th>
<th>B</th>
<th>D</th>
<th>Eb</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>408</td>
<td>406</td>
<td>386</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>bad</td>
<td>good</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ratios: 386¢ = 5:4, 408¢ = 81:64, 406¢ = 81:64 - schisma

The wolf fifth $G\#-Eb$ would rarely appear in contemporary practice. In Ramos's tuning system, the wolf fifth occurs between the pitches $G-D$—a much more objectionable location. According to Ramos's tuning, the wolf fifth $G-D$ (40:27) is 22 cents smaller than the pure perfect fifth (680 cents vs. 702 cents). This difference of a syntonic comma is quite audible and creates a perfect fifth that is very flat. Yet, consistent with his previous considerations in regard to the mixture of the accidental orders, Ramos labels the interval...
G-D as "good" while designating the interval C♯-Ab as a "useless diapente." This "useless interval" holds the value of 700 cents—only a schisma difference from a pure perfect fifth! Once again, Ramos chooses to accept the intervals that are notated as perfect fifths, but rejects the diminished sixth interval of C♯-Ab.

| TABLE 14 |
| EVALUATION OF THE DIAPENTE IN CENTS |
| ACCORDING TO RAMOS'S DIVISION |

<table>
<thead>
<tr>
<th>bad</th>
<th>good</th>
<th>good</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>702</td>
<td>702</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>C♯</th>
<th>G</th>
<th>Ab</th>
<th>D</th>
<th>E♭</th>
<th>A</th>
<th>B♭</th>
</tr>
</thead>
<tbody>
<tr>
<td>702</td>
<td>680</td>
<td>702</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>good</th>
<th>good</th>
<th>good</th>
</tr>
</thead>
<tbody>
<tr>
<td>702</td>
<td>702</td>
<td>702</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A</th>
<th>B♭</th>
<th>E</th>
<th>F</th>
<th>B</th>
<th>C</th>
<th>F♯</th>
<th>C♯</th>
</tr>
</thead>
<tbody>
<tr>
<td>702</td>
<td>702</td>
<td>702</td>
<td>702</td>
<td>702</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ratios: 680¢ = 40:27, 702¢ = 3:2, 700¢ = 3:2 - schisma,

\[^{3}\text{Ibid., 80.}\]

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Likewise, in his discussion of "good" and "bad" perfect fourths, Ramos accepts the interval $D-G$ (27:20, 520 cents) that is a syntonic comma greater than the pure perfect fourth, but rejects the augmented third $A_b-C\#$ that is only a schisma greater than the pure perfect fourth (500 vs. 498 cents).

### Table 15

**Evaluation of the Diatessaron in Cents According to Ramos's Division**

<table>
<thead>
<tr>
<th>Root</th>
<th>Good</th>
<th>Good</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>498</td>
<td>498</td>
<td>498</td>
</tr>
<tr>
<td>C$#$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F$#$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bb</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E$b$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ratios:** $498\# = 4:3$, $500\# = 4:3 +$ Schisma, $520\# = 27:20$
In many ways, Ramos remained a Pythagorean. He understood that the ditone must "theoretically" correspond to the Pythagorean ratio of 81:64 but, due to its audible harshness, he proposed an alternative that provided for pure major and minor thirds at some of the more common locations.

Ramos well understood that the typical fifteenth-century performer had little interest in the complicated ratios of speculative theory. Thus, rather than inundating the performer with complicated instrumental ratios, Ramos based his acceptance and rejection of the intervals upon regular and irregular _notational_ spellings; a method that the performer could easily understand and subsequently apply to effect purer thirds and sixths.

**Lindley's Misinterpretation (1975) of Ramos's Tuning**

In "Fifteenth-Century Evidence for Meantone Temperament," Mark Lindley asserts that Ramos is a proponent of meantone temperament—tempering fifths in order to acquire more resonant thirds and sixths. This assertion is grounded upon Lindley's manipulative and incorrect translation of Ramos's text, and justified by references to other period writings (including those of Gaffurius—Ramos's strongest _opponent_). Lindley's interpretation of Ramos's theories are, for the most part, nothing less than incredible leaps to unsubstantiated conclusions.
Lindley is correct to point out that Ramos oddly categorizes the wolf fifth $G-D$ as a "good" interval while disapproving of the interval $C\flat-A\flat$ but, as explained above, Ramos's intervallic evaluations are based upon the specific notation of the intervals rather than upon the actual value of the mathematical ratios themselves.

Lindley states that he could accept Ramos's tuning as a "Pythagorean" tuning if only Ramos had dismissed the interval $C\sharp-A\flat$ as a "bad" fifth. Lindley explains that either this Pythagorean tuning designation would be based upon a wolf fifth from $C\sharp-A\flat$ ("in which the thirds that beat profusely are labelled 'good' and those nearly pure 'bad,'"), or that Ramos's division is essentially a "regular meantone temperament with three flats and two sharps." An analysis of Ramos's evaluation of ditones (see Table 13 above), however, demonstrates the inaccuracy of Lindley's assertion. While it is true that Ramos labels the intervals that "beat profusely" (408 cents) as "good," the thirds that Ramos labels as "bad" can hardly be called "nearly pure," as categorized by Lindley. Ramos's "bad" thirds are only a schisma in difference from his "good" thirds (406 vs. 408 cents), and the "bad" thirds are actually closer to the pure intervals of 386 cents than to his "good" thirds.

---

"Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 41."
If one were to rely, as did Lindley, upon the comments of Ramos's contemporaries in order to understand the inconsistency in Ramos's terminology, a degree of clarity may be found in the passage where Spataro discusses the theoretical vs. practical nature of specific intervals:

... the more you try to criticize Bartolomé Ramos, my master, the more you get enmeshed and show clearly your ignorance, small knowledge, malice, and obstinacy ... Bartolomé Ramos has said that (only in practice, that is in musical usage and activity) the ditone corresponds to the 5/4 ratio, but not in speculative music, ... where the ditone corresponds to the ratio 81/64 ... the 81/80 ratio [the syntonic comma] (which is the difference between the Pythagorean intervals and the intervals used by experienced musicians is audible—not imperceptible as in your above-mentioned chapter you have concluded. For were it not appreciable, the harsh Pythagorean monochord would not [have to] be reduced, smoothing [it] to the sense of hearing ... Bartolomé Ramos [also] judged that the difference is perceptible between the 6/5 minor third and the minor third corresponding to the 32/27 ratio, because otherwise it would be self-defeating to add the 81/80 interval in order to reduce the musical intervals from harshness to smoothness.5

5"... quanto piu tu cerchi reprehendere Bartolomeo Ramis mio preceptore, tanto piu te ne vai intricando: et fai manifesta la tua ignorantia: poco sapere: malignita: et obstinatione ... da Bartolomeo Ramis e stato dicto che (solo in practica overo in la Musica usitata: et activa el ditono cadete in la comparatione sesquiquarta: & non in la Musica speculativa ... in la quale cade el ditone tra .81. ad .64. comparati ... la proportione cadente tra .81. ad .80. laguale e la differentia cadente tra li pythagorici intervalli: & li intervalli da li modulanti usitati e sensibile; & non insensibile come nel predicto tuo capitolo hai concluso. Perche non essendo sensibile: el duro monochordo pythagorico non seria riducto in molle al senso de lo audito ... da Bartolomeo Ramis e stato inteso essere differentia sensibile tra il semiditono sesquiquinto & il semiditono cadente tra .32. ad .27. comparati: perche altramente: el seria frustratorio la addictione de lo intervallo cadente tra .81. ad .80. circa el riducere li Musici intervalli de duro in molle ... ." Spataro,
Lindley interprets this passage, in which Spataro discusses the syntonic comma, as evidence that Ramos promoted meantone temperament; Spataro, however, makes no mention in this passage of tempering the fifths or of any division of the syntonic comma into fourths—a necessary requisite in the generation of meantone temperament. Moreover, the wolf fifth that would arise from meantone temperament falls between $G\#-E\flat$ (approximately 59 cents larger than the wolf fifth of just intonation), whereas the wolf fifth in Ramos's tuning occurs between $G-D$. Spataro does, in fact, refer to a tuning discrepancy, but it is not the discrepancy between Pythagorean tuning and meantone temperament as Lindley asserts; rather, it is a discrepancy between Pythagorean tuning and just intonation.

Lindley continues his discourse by addressing Ramos's disregard for the necessity of having a pure fifth on $C\#-G\#$. Because Ramos's monochordal division uses the pitch $A\flat$ rather than $G\#$, Ramos proposes cadential alternatives that can be utilized by the performer in order to avoid the interval of $C\#-G\#$ which, he claims, is a "useless diapente, since it is rarely made and, to tell the truth, should never be made."

---

_Errori di Franchino Gafuria da Lodi_ (Bologna, 1521), ff. 21v-22r; quoted and translated by Mark Lindley, "Fifteenth Century Evidence for Meantone Temperament," 42.

"Ramos de Pareia, _Musica practica_, 80."
In order to avoid the problem that results from the use of $A\flat$ instead of $G\#$, Ramos provides an alternative for the traditional double leading-tone cadence, demonstrated below in Figure 1. Because Ramos's scale does not have the pitches $D\#$ and $G\#$, but rather the enharmonic spellings of $Eb$ and $Ab$, Ramos suggests that poor intonation can be avoided by moving the tenor from $B\flat$ down to $A$, the middle voice from $D$ to $E$, and the cantus from $G$ to $A$. The final result is a Phrygian cadence, rather than a Lydian cadence. By changing the cadence in this manner, singers can not only avoid both the "bad ditone" of $B-E\flat$ and the "bad major hexad" of $B-Ab$ but, as Ramos states, such a transition will not only be "good," but will be even "better, sweeter, and smoother" than the first.

![Figure 1. Ramos's Proposed Alternative to the Traditional Double Leading-Tone Cadence](image)

Ramos's suggestion of a cadential alternative to avoid the $G\#$ and the discourse that follows clearly demonstrates his interpretation of the A cadence as a representative of the deuterus, rather than the protus, mode. In *Musica Ficta: Theories of Accidental Inflections in Vocal*

[^7]: Ibid.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Polyphony from Marchetto da Padova to Gioseffo Zarlino, Karol Berger notes that there was considerable disagreement during the period regarding the modal interpretation of the A cadence, especially in regard to the choice of which leading tone should be implemented by the performer. Most theorists maintained that A was the *finalis* of the *protus* mode and, therefore, such a *finalis* implied a lower leading tone G#. Prosdocimus, Ugolino, and Ramos, insisted that A was the *finalis* of the *deuterus* mode with a key signature of one flat and, therefore, such a *finalis* implied an upper leading tone of Bb. Although examples do exist to provide evidence that composers did acknowledge the A cadence within the confines of the deuterus mode—even when there were no flats in the signature—the overwhelming majority of fifteenth-century musicians favored the use of the A cadence within the confines of the protus mode. In fact, no matter what the mode, there seems to be a preference at cadences for the implementation of the lower leading tone whenever

---


possible. There can be little doubt of Ramos's conviction that the A cadence is representative of the deuterus mode:

And if anyone wishes to say that there [on h] ten the protus is born again, and the conditions which d held to should also be obtained on h, and [that] since d was shown to have a semitone below and above itself, h also [ought to proceed] in the same way, we will respond by saying that the argument does not proceed [logically], since the former held g, which claims all similitude to itself below and above in the synëmmenôn tetrachord. Nevertheless, [this is not true] with h, because it contains two tones below itself. . . . Therefore, that string [h] is the deuterus in the conjunct [tetrachord, and it is] as much authentic as it is plagal.11

Ramos's conviction is grounded in logic; his choice for a modal interpretation of the A cadence within the deuterus mode rests heavily upon a determination to avoid the necessity of the pitch G♯--a pitch that does not occur in Ramos's monochordal division.

It should be noted that Ramos does not prohibit the use of the lower leading tone in the D cadence. In his discussion of counterpoint, Ramos advises the reader to change the minor sixth into a major sixth whenever this penultimate interval leads to the octave, and provides an example with a lower leading tone (C♯) instituted by means of musica ficta (see Figure 2).12

10 For Ramos, h refers to the pitch a.

11 Ramos de Pareia, Musica practica, 80.

12 "But if [the tenor] descends from e to d, or at another similar place, the organum must not make k l because it is a minor sixth. But if we wish to do [this], it is necessary to raise k if we ascend from the lower part [to a
Further, in his fifth rule of counterpoint—a rule in which the minor third leads to the unison—Ramos reveals a bias for the upper leading tone cadence in passages that come to rest on a unison.

Figure 2. Ramos's Lower and Upper Leading-Tone Cadences

In the penultimate chapter of his treatise, Ramos continues his discussion relative to the tuning of g and h, referring to the fact that the major third above E (G#) will be out-of-tune in a Burgundian cadence approaching an A finalis. Ramos advocates the complete elimination of the G# either by employing only the root and fifth of the concord, or by substituting the pitch G‡ for G# (see Figure 3).

But other practicing musicians say: "If this [tuning of the note between g and h] were to be made, the diapente e-square ‡ would not have an intermediate third [g‡]," which is a major [third] in relation to the lower [note] and a minor [third] in relation to the upper [note], as we have said in the second part, the third treatise [in the chapter] concerning composition. But this is not an obstacle, because when that [harmony] of the Phrygian is aroused, it does not matter if it lacks the intermediate third, or if the major [third] is established in relation to the upper [note] and the higher] note, or to sustain [e] if we descend from the higher note [to the lower note—that is, from c to b]."
Ibid., 52.
minor [third] is established in relation to the lower [note].

\[ \begin{align*}
\text{or} \\
\text{instead of}
\end{align*} \]

Figure 3. Ramos's Alternatives to the Traditional Burgundian Cadence

Lindley, however, translates the passage related to Burgundian alternatives in the following manner:

Now other practitioners say [that] in this arrangement B and its fifth do not have the intermediate third [D♯] major to the lower note [B] and minor to the upper [F♯]. But that is no obstacle, because in a Phrygian [cadence] it does not matter if that third is missing or if the third placed there is a major third to the upper note and minor to the lower [i.e., D♯].

The fifth to which Ramos's discussion is directed concerns E-B♯, not B-F♯ as is stated by Lindley. It is possible that Lindley's error results from a misunderstanding of Ramos's literary style. In the phrase "diapente e-♯ quadro," Lindley translates the Latin "e" ("from," or

\[13\text{Ibid, 80.}\]

\[14\text{Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 48.}\]
"out of") followed by the letter b (♭) as "B and its fifth," i.e., B-F#. Ramos, however, does not employ the word "e" in the sense of "from" in any part of the treatise; rather, Ramos uses the word "ex" to render this meaning. Further, Ramos makes absolutely no mention of the pitch name F# in this passage. One may argue that a literary preposition should occur before the pitch E, but Ramos rarely uses a preposition before such a letter that represents a pitch; rather, the reader must insert this preposition for himself. Ramos is not, as Lindley believes, referring to a cadence (in modern terms) of V-i in E minor, nor is Ramos referring to the major third above B (D#), for he has already demonstrated in preceding paragraphs that the pitches B-D# (E♭) will be acoustically unacceptable. Rather, Ramos is emphasizing that the pitches E-G# will result in intonation problems and that such a concord should be avoided whenever his tuning method is employed. Ramos assumes that the reader knows exactly

15 In Part 1, Treatise 1, Chapter 2, Ramos uses the word "e" in the phrase "e regione" ("in a straight line"). This is an idiomatic phrase and does not serve to support the argument of "e" as a typical component in Ramos's Latin style usage.

16 See Lindley's Example 1, 47.

17 This error also appears in Barbour's Tuning and Temperament, 92. Such a mistake is understandable due to the fact that Ramos leaves out the necessary nouns and pitch names that would help to clarify his meaning.
what he means; singers are to avoid $D\#$ and $G\#$ whenever they choose to implement his division of the monochord.

This interpretation of the passage relating to Burgundian alternatives is verified by the subsequent paragraph in the *Musica practica*:

But some [people], wishing to satisfy both parts, insert another string between the third $b [ab]$ and $h$, which they make distant from the third $b [ab]$ by the space of a comma. Nevertheless, this is not praised on account of this: because then it would be another mixed genus rather than the simple diatonic [genus].

Here, Ramos notes that one solution to the concerns posed by the lack of $G\#$ is to insert an additional string between $a b$ and $h$. Lindley makes use of this passage in an attempt to substantiate his hypothesis that Ramos was an advocate of meantone temperament. Although it is true that additional strings were occasionally employed on keyboard instruments to split certain black keys that would have otherwise produced unacceptable intonations, and while it is also true that the use of split keys was a manifestation of meantone temperament, Ramos clearly instructs against this approach based on the fact that it results in another mixed genus rather than the simple diatonic genus.

Lindley again misinterprets Ramos's comments concerning Tristan de Silva's endorsement of an extra string inserted between $F$ and $F\#$ that would serve to introduce $G\#$ to the gamut. Having supplied yet another faulty

---

translation—one clearly taken out of context with the blatant omission of a section that is necessary for its correct understanding—Lindley concludes that Ramos is of the opinion that the extra string proposed by de Silva is "pointless," and that Ramos prefers to split $Ab/G\#$:

Now my friend Tristan de Silva used to say that another string should be inserted between $F$ and $F\#$. From this intermediate third we gain not utility, but discrepancy and discord in the whole system, since neither another natural nor an accidental of another type [i.e., a flat] is to be gained by this means. But enough on this point. (However, the first proposal is better proof of which in another volume I shall explain with very firm mathematical reasoning.) But now with an epilogue to the above I shall end this work.\(^{19}\)

Lindley's interpretation is nothing short of a manipulation of the original text; it serves to support Lindley's argument that Ramos was an advocate of meantone temperament.

First, Ramos states that de Silva's solution is erroneous, and that he, Ramos, accepts neither the addition of the string between $F$ and $F\#$ nor the addition of the string between $Ab$ and $A$. Second, an accurate translation of the passage clearly demonstrates a view quite opposed to the one advanced by Lindley:

But our friend Tristan de Silva used to say that another string should be inserted between $f$ and the second $\# [f\#]$. And thus he claimed to have discovered it by means of the numbers themselves. Indeed, we believe that the error will appear to him just as [the error] that gamma—a note which was added by our

\(^{19}\)Lindley, "Fifteenth-Century Evidence for Meantone Temperament," 51.
[predecessors]—would someday be treated as proslambanomenos. Therefore, we do not believe that the latter [the string between F and F♯] nor the former [the string between A♭ and A] should be admitted in our diatonic genus. For then we would fall into that error which we have read Timotheus of Mileus fell into—according to the testimony of Boethius—namely, that he converted the diatonic genus into the chromatic (which is better). [And] on account of this, the Lacedaemonians of Laconia cast him out of the city, since he was harming the souls of the young boys which he had accepted for the purpose of teaching, and by deviating from the moderation of virtue toward softness, he was producing effeminate [young men]. Therefore, that intermediate third does not bring usefulness as much as it advances discrepancy and discord in the entire order, since, as the masters say, by this means it may not be arranged according to the natural [order] nor according to another accidental order. But enough concerning these things. Nevertheless, they will better perceive [the concepts] of the first [volume], whose truth we will explain in the following volume with the firmest numerical calculations. But now, let us put an end to this work by continuing [with] the epilogue mentioned above.  

One might assume that Lindley's omission of the significant text concerning Ramos's rejection of the extra strings can be attributed to differences between the A-80 and A-81 editions; for the missing section of text that would destroy Lindley's argument may only be found in the A-81 edition of the Musica practica. An examination of Lindley's article, however, reveals that Lindley possessed and relied largely upon Johannes Wolf's modern reprint of the Musica practica; this reprint includes the text for both editions.

20Ibid., 80-81.
the A-80 and A-81 editions. Further, Lindley's translation of the last portion (referring to the discrepancy and discord brought about by the intermediate third) reveals that he did indeed have A-81 in his possession, for this portion of text only appears in the A-81 edition. By means of this evidence, one can only conclude that Lindley had access to the A-81 edition, but chose to omit this important passage because it undermines his hypothesis of meantone temperament.

Conclusion

Twentieth-century musicologists have attempted to categorize Ramos's monochordal division as either a form of meantone temperament or of just intonation. Clearly, Ramos's tuning does not fall under the generally accepted definition of meantone temperament. Although meantone temperament is similar to just intonation with respect to the employment of pure major thirds, meantone temperament is based upon the tempering of fifths (by one-fourth of a syntonic comma) and upon the utilization of equal-sized whole tones. Lindley's assertion that a form of meantone

---

21See Lindley, "Fifteenth-Century Evidence for Meantone Temperament," footnotes 3, 4, 5, 8, 9, 25, 27, and 42. See also Wolf, ed., Musica practica, 102.


23The first true discussion of meantone temperament appears in Pietro Aaron's treatise Thoscanello (1523).
temperament is proposed in the *Musica practica* is without merit; Ramos advocates the use of ten pure fifths and two different sizes of whole tones (9:8 and 10:9). Admittedly, Ramos accepts two impure fifths (G–D and C♯–A♭) rather than the single wolf fifth that was indigenous to most tuning systems of the fifteenth century, but this single inconsistency is hardly sufficient to label Ramos as a proponent of meantone temperament. Further, Ramos advises against the use of split keys—a salient feature of meantone temperament—because he strongly discourages the use of different strings for enharmonic pitches.

Several musicologists, including François Fétis, have assumed that Ramos was an advocate of equal temperament. Ramos, however, did not believe that enharmonic spellings could be acoustically equivalent and, therefore, the argument that Ramos was an advocate of equal temperament must be rejected.

The tuning method proposed by Ramos results in a temperament that is more conducive to some keys than to others; such a factor could lead one to conclude that Ramos's tuning was actually a type of irregular temperament. While irregular keyboard temperaments were more prevalent during the late seventeenth and early eighteenth centuries,

---

Ramos's monochordal division does indeed contain characteristics inherent to irregular temperament.

Irregular keyboard temperaments generally require that the more frequently used thirds are tempered to a lesser degree than the thirds that are employed less frequently, and that not all fifths have the same ratio. Ramos himself proposes the use of three different sizes of thirds, which results in a temperament where certain key signatures are more "in tune" than others. Ramos's method cannot be classified as irregular temperament, however, because the purpose of re-tuning the fifths in irregular keyboard temperaments is to eliminate the wolf fifth; the wolf fifth is a salient feature of Ramos's system.\(^{25}\)

Barbour's description of Ramos's method as "an irregular tuning, combining features of both the Pythagorean tuning and just intonation"\(^{26}\) may be the best description to encompass the intricacies of Ramos's tuning system. Ramos's system not only provided the practicing musician with a simpler division of the monochord, but allowed for a

\(^{25}\)The first published description of irregular temperament within a complete chromatic tuning appeared twenty-nine years after the publication of the Musica practica. See Arnolt Schlick's Spiegel der Orgelmacher und Organisten (1511).

\(^{26}\)Barbour, Tuning and Temperament, 4.
greater number of pure intervals and triads whenever the division was utilized in certain key signatures.\textsuperscript{27}

A examination of Ramos's monochordal division and his comments about this division in the \textit{Musica practica} reveal his true intentions. Ramos did not propose his tuning with the intention of abolishing the Pythagorean ratios; for these ratios figure predominantly in his proposed monochordal division. Rather, Ramos offered his tuning system as a refinement to Pythagorean tuning in order to meet the demands of the fifteenth-century practicing musician. The result of Ramos's modifications to the Pythagorean system was a tuning that greatly increased the number of pure intervals, thus improving intonation, and profoundly influencing the future development of instrumental tuning.

\textsuperscript{27}Although Ramos's tuning results in unacceptable major and minor triads on $G$ (an audible \textit{faux pas} that is difficult to dismiss), an examination of Ramos's monochordal division reveals the existence of several pure triads that fall within the common key signatures employed during this period, i.e., the three pure major triads of $C-E-G$, $F-A-C$, $Bb-D-F$ and the three pure minor triads of $A-C-E$, $D-F-A$, $E-G-B$. Furthermore, there are several other triads in Ramos's tuning that would likewise find acceptance among the advocates of Pythagorean tuning as well as in the circles of the fifteenth-century practicing musician.
PSALLITUR PER VOCES ISTAS: AN ALTERNATIVE TO GUIDONIAN SOLMIZATION

Guido d'Arezzo introduced a new method for the singing of plainsong in his *Epistola de ignoto cantu* (ca. 1032). This method is based upon the assumption of hexachords of identical construction, beginning on the pitches C, F, and G, that overlap to form a range of twenty-two available pitches.¹ The intervallic successions are identified by the six vocables ut, re, mi, fa, sol, la—the first textual syllables of the six phrases that appear in the Latin hymn *Ut queant laxis*—each of which begins a step higher than the preceding phrase.

Each of the hexachords consists of an intervallic succession of tone—tone—semitone—tone—tone; to preserve this pattern $B\flat$ (b rotundum) and $B\sharp$ (b quadratum) are required in the respective F and G hexachords.² Thus, in the hexachord system, the semitone is always fixed by the

¹ Ramos claims that Guido separated the initial pitches of the hexachords by the distance of the tetrachord (G, c, f) in order to imitate the teaching of Boethius and thereby, adhere to the auctoritas. Ramos de Pareia, *Musica practica*, 10.

² These signs b rotundum and b quadratum are the precursors of the flat and natural/sharp signs, respectively, that appear in modern notation.
syllables mi-fa that serve to establish the relative positions of the seven overlapping hexachords extending from G (Γ) to e^2. These seven interlocking hexachords, alternatively referred to as the deductiones, begin on the respective pitches of G, c, f, g, c^1, f^1, g^1. The hexachord beginning on G (G A B♭ C D E)—due to its employment of the hard or square b (b durum or b quadratum)—is designated as the hard hexachord (hexachordum durum); the hexachord on F (F G A B♭ C D)—due to its employment of the soft or round b (b molle or b rotundum)—is designated as the soft hexachord (hexachordum molle); and the hexachord on C (C D E F G A)—without either soft or hard b—is designated as the natural hexachord (hexachordum naturale).

No ambiguity exists regarding the specific location and function of a pitch. The exact location of a pitch within the gamut is identified by its letter name and its appropriate vocable or vocables. Thus, a particular pitch is identified by one, two, or three solmization syllables—depending upon that pitch's location in the gamut—as well as its function within the system. Wherever the same letter name and syllable occur on the same pitch class, the additional designation of graves, acutae, or superacutae is employed (i.e., the pitch A is more properly identified as a...

---

3This explains why the Guidonian gamut is a construct of 22, rather than 23 pitches. Only two of the three B's possess the dual function of hard b and soft b; the lowest, B mi, functions only as hard b.
re, while the pitch a is called a la mi re (graves), and the pitch a\textsuperscript{1} is called a la mi re (acutae).\textsuperscript{4} For pedagogical purposes, the hexachord gamut is illustrated in Medieval-Renaissance treatises in the form of a scala (ladder). Table 16 is a modern representation of the typical scala that was used to illustrate the Guidonian system.

Even in the positions of b and b\textsuperscript{1} (which contain syllables that differ in pitch by a chromatic semitone), the use of the syllables mi and fa designate the desired pitch: 
mi refers to b quadratum\textsuperscript{5} while fa refers to b rotundum.
In general, b quadratum is assumed unless flat signature signs or principles of musica ficta\textsuperscript{6} are used to express the opposite alternative.

Plainsong of the Middle Ages was not, of course, limited to the six-note range of the hexachord. To enable a singer to freely ascend and descend throughout the gamut, a procedure known as mutation serves to accommodate those melodies extending beyond the range of a single hexachord.
If, for example, a singer wishes to sing an ascending eight-

\textsuperscript{4}Although Ramos uses the traditional designations of acutae and graves in his explanation of the Guidonian gamut, he generally refers to these pitches simply as the "first" or the "second" a la mi re, respectively.

\textsuperscript{5}Because the square b sign is the ancestor of our present-day natural sign, the sign \textsuperscript{i} is used in this dissertation to designate b mi.

\textsuperscript{6}See Chapter VI of this commentary for a more thorough discussion of musica ficta.
TABLE 167
THE GAMUT OF THE GUIDONIAN HEXACHORD SYSTEM

<table>
<thead>
<tr>
<th>Present-day designations</th>
<th>Deductiones</th>
<th>Medieval designations</th>
</tr>
</thead>
<tbody>
<tr>
<td>e²</td>
<td>la</td>
<td>ee la</td>
</tr>
<tr>
<td>d²</td>
<td>la sol</td>
<td>dd la sol</td>
</tr>
<tr>
<td>c²</td>
<td>sol fa</td>
<td>cc sol fa</td>
</tr>
<tr>
<td>b¹</td>
<td>fa mi</td>
<td>bb fa (or) bb mi</td>
</tr>
<tr>
<td>a¹</td>
<td>la mi re</td>
<td>aa la mi re</td>
</tr>
<tr>
<td>g¹</td>
<td>sol re ut</td>
<td>g sol re ut</td>
</tr>
<tr>
<td>f¹</td>
<td>fa ut (D)</td>
<td>f fa ut</td>
</tr>
<tr>
<td>e¹</td>
<td>la mi (M)</td>
<td>e la mi</td>
</tr>
<tr>
<td>d¹</td>
<td>la sol re</td>
<td>d la sol re</td>
</tr>
<tr>
<td>c¹</td>
<td>sol fa ut</td>
<td>c sol fa ut</td>
</tr>
<tr>
<td>b</td>
<td>fa (N)</td>
<td>b fa (or) b mi</td>
</tr>
<tr>
<td>a</td>
<td>la mi re</td>
<td>a la mi re</td>
</tr>
<tr>
<td>g</td>
<td>sol re ut</td>
<td>G sol re ut</td>
</tr>
<tr>
<td>f</td>
<td>fa ut (D)</td>
<td>F fa ut</td>
</tr>
<tr>
<td>e la mi (M)</td>
<td>E la mi</td>
<td></td>
</tr>
<tr>
<td>d sol re</td>
<td>D sol re</td>
<td></td>
</tr>
<tr>
<td>c fa ut</td>
<td>C fa ut</td>
<td></td>
</tr>
<tr>
<td>B mi (N)</td>
<td>B mi</td>
<td></td>
</tr>
<tr>
<td>A re</td>
<td>A re</td>
<td></td>
</tr>
<tr>
<td>G ut (D)</td>
<td>Γ ut</td>
<td></td>
</tr>
</tbody>
</table>

7 This dissertation uses the modern designation of c¹, c², etc. rather than the capital, lower-case, or double lower-case letters found in Medieval-Renaissance treatises; (D), (N), and (M) represent the durum, naturale, and molle, hexachords, respectively.
note scale from G to g, he should make a shift from hexachordum durum to hexachordum naturale via the reassignment of a particular pitch's function within the system. Thus, when the singer arrives at the pitch c fa (its designation in the hard hexachord), he replaces it with c ut (its designation in the natural hexachord) and continues his ascent to complete the eight-note scale. The concept of mutation is an integral component of the functional hexachord system; although variants are proposed by several Medieval-Renaissance theorists, the technique itself had suffered only minor modifications before the publication of the Musica practica.

Ramos's Discussion of the Gamut

In Part 1, Treatise 1, Chapter 3, Ramos discusses the "errors" of Guido and his followers in regard to the technical organization of the medieval gamut. He notes that only seven letters exist—not twenty as Guido claimed—because the letters are repeated at the octave. Further, Ramos criticizes the Guidonian division of the gamut that classifies the pitches as eight graves, seven acutae, and five superacutae, because "the eighth and the first letter are shown to differ only in respect to [their] highness and lowness." Ramos discusses how the Guidonians claim to have based their division on Boethius, since Boethius

---

Ramos de Pareia, Musica practica, 9.
himself placed \textit{g} among graves; Ramos notes, however, that \textit{g} no longer belongs to graves due to the later addition of the letter \textit{r} by Pope Gregory. In a clear attempt to organize the gamut by octaves rather than hexachords, Ramos re-categorizes its pitches as seven graves (\textit{r}, \textit{A}, \textit{B}, \textit{c}, \textit{d}, \textit{e}, \textit{f}), seven acutae (\textit{g}, \textit{a}, \textit{b}, \textit{c}, \textit{d}, \textit{e}, \textit{f}), and six superacutae (\textit{g}, \textit{a}, \textit{b}, \textit{c}, \textit{d}, \textit{e}).

**Ramos's Alternative to Guidonian Solmization**

Ramos's division of the monochord requires two sizes of whole tones, 9:8 and 10:9. A significant problem evolves from this division, however, if the performer chooses to use the solmization syllables that were proposed by Guido d'Arezzo: the notes ut re mi of the natural hexachord result in the whole tone intervals of 9:8 and 10:9, respectively, while the notes ut re mi of the soft hexachord result in the whole tone intervals of 10:9 and 9:8. This incongruity between whole tones appears to be the main reason behind Ramos's abandonment of Guido's method of solmization; for Ramos points to this incongruity as the justification for suggesting an alternative method.

In Part 1, Treatise 2, Chapter 6, Ramos addresses the difference that occurs between the whole tones of 9:8 and 10:9 when the hexachord system is employed within his monochordal division. He notes that the pitch \textit{g} sol re ut
holds a difference in size depending upon its function in the various hexachords:

For the difference of music is built upon the quantity of the arsis and thesis, and it is not based upon the magnitude or, if you prefer, the strength or weakness of a note. For when the three properties of the notes—differing among themselves—are arranged in Guido's theory, it is necessary to establish a difference between the equal notes. For it will be necessary to make a difference between g sol re ut (the sol of the natural [hexachord]) and re of the soft b [hexachord] or ut of the hard # [hexachord]. Likewise also [it will be necessary to make a difference between] re and ut. As I was saying, they are not equals, and consequently a mutation cannot be made upon them. And nevertheless, [Guido's followers] make [a mutation] according to their doctrine that was already discussed above.⁹

The difference between the whole tones that result from Ramos's monochordal division is not, however, the only reason that he sought an alternative method of solmization. The increased use of chromaticism through the recognition and employment of irregular hexachords, i.e., coniunctae, resulted in flat or sharp accidentals on virtually every note and greatly complicated the matter of mutation. With characteristic sarcasm, Ramos begins his discussion in Part 1, Treatise 1, Chapter 4 by casting an insult toward Guido, proclaiming him "a better monk than a musician."¹⁰ Ramos scolds Guido for his dependence upon the senaria as the theoretical justification for the hexachord system and,

⁹Ibid., 31.

¹⁰Ibid., 10.
in Chapter 8 of the *Musica practica*, exalts the merits of the number eight over the number six in the hope of demonstrating the superiority of his own system over that proposed by Guido.

Such homage to number is typical of the Medieval-Renaissance musician. In his discussion of Guido's hexachord system, Ramos briefly mentions that mathematicians consider the number six, the *senaria*, to represent perfection; Ramos does not elaborate on the reasons for this perfection, assuming that its quality of perfection is obvious to the reader. In the introduction to Gioseffo Zarlino's treatise *Le istitutioni harmoniche* (1558), Claude Palisca gives the present-day reader an explanation of the *senaria's* significance in the Middle Ages and Renaissance:

The number 6 has the virtue of being the first perfect number, meaning that it is the sum of all the numbers of which it is a multiple ($1 + 2 + 3 = 1 \times 2 \times 3 = 6$). Many evidences are given of the power of this number. There are six planets in the sky. In the *Philebus*, Plato says hymns should not celebrate more than 6 generations. There are 6 species of movement: generation, corruption, increase, diminution, alteration, and change of location. According to Plato, there are 6 differences of position: up, down, ahead, behind, right, left. There are six types of logic, and the world was created in six days. And these do not exhaust the list. In music, the significance of the *senario* is that all the primary consonances can be

---

11It is not coincidental for such a Medieval-Renaissance author to have reserved "Chapter 8" for his discussion of the "number 8."
expressed as superparticular ratios [2:1, 3:2, 4:3, 5:4, 6:5] using only numbers from 1 to 6.\textsuperscript{12}

In Part 1, Treatise 1, Chapter 8, Ramos spends an entire chapter promoting the perfection of the number eight, which forms the basis of his octochordal solmization system. Ramos reasons that, although the number six is considered to be perfect by mathematicians, and while the number seven represents the (known) planets of the universe, the number eight, also can be shown to possess "great perfection." Ramos proposes that by adding the firmament to the seven planets, one arrives at a more "heavenly" perfection than that achieved by those mathematicians who exalt the number six. Ramos provides further evidence for the perfection of the number eight with his observation that it is proven to be "geometrically perfect" within the solid body of a cube containing eight angles. Ramos concludes his discussion with the admonition that "whoever truncates or diminishes the eight notes from our music takes perfection and fullness away from it."\textsuperscript{13}

In Part 1, Treatise 1, Chapter 7, Ramos introduces his alternative method of solmization as a replacement for the six-vocal system that had been devised by Guido. He


\textsuperscript{13}Ramos de Pareia, Musica practica, 19.
suggests that the student first become familiar with the pitches in the octave from c to c¹ by using the monochord as a reference. Although Ramos refers to various syllable systems that had been suggested by theorists of the past (e.g., noe noananne caneagis, tu pro de no tri te ad, and of course, ut re mi fa sol la), he believes that the employment of such syllables had become greatly overvalued, and he derides the followers of Guido for acting as though the syllables are "entirely necessary to music."¹⁴ Ramos retains the use of syllables, but introduces a solmization system based upon the octave, rather than the hexachord, employing the mnemonic vocables Psal-li-tur per vo-ces is-tas. Note that the new system is initiated on c rather than F, because "sound begins from the letter c."¹⁵

In Guido's hexachordal system, the semitone is always marked by the syllables mi-fa; in Ramos's octochordal system, the first semitone appears between the pitches E and F, but the second semitone may occur in one of three different locations: between A-Bb, Bb-B♭, or B♭-C. Thus, in Ramos's system of solmization, the vocable is may represent either B♭ or B♭. Recognizing that he would receive criticism for not using the same syllables to

¹⁴Ibid., 16.

¹⁵Ibid. The meaning of this sentence becomes clear in Part 1, Treatise 2, Chapter 5 where Ramos points out that, in Spain, the ancient monochords and organs begin on c grave.
designate the position of the semitone, Ramos rationalizes that the position of the semitone remains evident to the singer by virtue of the fact that the syllables of all three semitones—\(\text{ces, is, and tas}\)—end with the letter \(s\).

Alarmed by the number of mutations that were necessary to sing the chromatic compositions of his day, Ramos employs only one mutation in his solmization method on the pitch class \(C\). Ramos notes that the syllable \(\text{tas}\) appears on the pitch \(c^1\) at the top of the octave scale. If the singer anticipates that he is going to ascend above \(c^1\), then he is required to make a mutation by changing \(\text{tas}\) to \(\text{psal}\), and thus ascend to the second octave scale. Typical of a fifteenth-century theorist, Ramos provides a lengthy explanation of why eight syllables are necessary to account for the seven different notes of the diatonic scale; his argument is based upon a desire to demonstrate the difference in range between two \(C\)'s an octave apart, with the syllables \(\text{psal}\) and \(\text{tas}\) demonstrating the opposites of high and low as well as similarity and diversity.

Nevertheless, someone may doubt—and not without reason—why we establish eight different [syllables], since there are only seven different [notes]; and will remember that it was submitted and taught by us in this way. It is necessary to say that although we have claimed the greatest conformity and similarity between the first [voice] and the eighth [voice], nevertheless, we have never denied them to differ in [regard to their] highness and lowness. Therefore, we have demonstrated both the difference and the similarity between them. We have shown similarity and conformity when we have set down the same vowel letter—namely a [for \(\text{psal}\) and \(\text{tas}\)]; however, with the other letters at the beginning [of the

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
syllable]—that is, s or t—we have revealed the difference of [their] highness and lowness, having recognized their dissimilarity. For when the breath is drawn from the depth of the chest [the sound] is low, but when it is emitted from the surface of the mouth [the sound] is high. The deeper the pronunciation is made in the region around the lung, the lower it sounds; the closer it comes to the mouth cavity, the higher it sounds. Therefore, in this way we know that the letter t united with [the letter] a is produced by the contact of the tongue and the closure of the teeth. And we do not doubt that [the letter] s united with [the letter] a is produced by the application of the tongue to the palette. Therefore, it is clear from what has been said that [p]sal is lower than tas. And if we consider the difference of highness and lowness in the pronunciation of [the letter] l and [the letter] s at the end of the syllable, it will be agreed that such a discussion was most suitably made by us. For the liquid letter l naturally emits a low sound; however, the density of the letter s rises into the high range as if [it were] whistling. And no voice is higher than whistling.

The Guidonian Hand

The solmization syllables are used as an aural pedagogical/mnemonic device to assist the student in internalizing the consecutive steps of the gamut. Historically attributed to Guido, the Guidonian hand (manus Guidonis) is the visual manifestation of the gamut. The manus Guidonis places the various pitches and solmization syllables of the medieval gamut in the spaces that occur between the joints of the fingers. By pointing to the locations on the hand, a teacher can visually demonstrate the various intervals of the gamut and thereby reinforce the discussion of audible principles.

16Ibid., 18.
The left hand is generally selected by the Medieval-Renaissance theorist to portray the Guidonian hand in musical treatises. Karol Berger discusses Johannes Tinctoris's observations, in his *Expositio manus*, as to why the left hand is generally chosen for this portrayal:

... the places in the left hand are more easily indicated by the index finger on the right, even though some people most aptly indicate the places on the thumb of the left hand with the index finger of the same hand and the places on the other fingers similarly by the thumb of the same hand; wherefore they may use only one hand, that is, the left, in the instruction of this particular kind of lesson.  

Although historical evidence affirms that the hand was primarily perceived as a pedagogical aid for the beginning singer, Margaret Bent suggests that the hand may have also served a function in Medieval-Renaissance performances. Bent proposes that the Guidonian hand might have been used as a visual signal to cue the performers to mutations or *ficta* alterations, and thus may have served to coordinate the actions of the choristers. Such a hypothesis may

---

Solis notare litteris optime probavimus, quibus ad addiscendum cantum nihil est facilius, si frequen-
ttas fuerint saepe tribus mensibus.

Manus Guidonis.

Figure 4. Figura 3 of the Musica practica, 11.
Source: Johannes Wolf, ed. Musica practica, 13.
Figure 5. Figura 6 of the Musica practica, 36. 
Source: Johannes Wolf, ed., Musica practica, 47. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
provide an explanation for the raised hand that often appears in the illustrations of medieval choristers.\textsuperscript{18}

In Part 1, Treatise 1, Chapter 4, Ramos includes an illustration of the traditional Guidonian hand (see Figure 4 above). Later, in Part 1, Treatise 2, Chapter 7, Ramos includes a revised version of the hand (see Figure 5 above) in which the pitch class \textit{C} appears at the bottom of each finger (\textit{c} at the base of the index finger, \textit{c}\textsuperscript{1} at the base of both the middle and ring fingers, and \textit{c}\textsuperscript{2} at the base of the little finger) and in which the seven notes of the lowest octave are applied to both sides of the thumb and wrist.

\textbf{Conclusion}

As in the case of the monochordal division, Ramos attempts to ease the task of the practicing musician by doing away with the complicated solmization systems of the past and introducing a method that recognizes and accounts for contemporary practice. With regard to a new order of solmization, Ramos attempts to shield the practicing musician from the complexities that result when one attempts to apply an antiquated diatonic solmization to music that is becoming increasingly chromatic.

Ramos did not escape criticism for his condemnation of the \textit{auctoritas}. In the opening pages of the \textit{Musices}

\textsuperscript{18}Margaret Bent, "Musica Recta and Musica Ficta," \textit{Musica Disciplina} 26 (1972): 90-91.
opusculum, Nicolaus Burtius attacks Ramos both for his irreverence toward Guido and for his proposal of a new method of solmization;¹⁹ in the Excitatio quaedam musicae artis per refutationem, John Hothby addresses Ramos's "errors" and reprimands him for proposing new syllables to designate the position of the semitones.²⁰

It is obvious that Ramos recognized the unlikelihood that his solmization system would be accepted by his contemporaries, for he devotes a considerable portion of the Musica practica to a detailed discussion of the Guidonian system, focusing upon the aspects of musica ficta and mutation within the confines of such a system.

Although harshly criticized, Ramos's proposed octochordal method was an innovation that profoundly affected the practice of solmization.²¹ Not only was Ramos the first to suggest an alternative to Guidonian solmization, but he was also the first musician to advocate the "fixed do" system of solmization.

¹⁹See Burtius, Musices opusculum, a2r-a4r.
²¹Other octochordal solmization systems were subsequently proposed, e.g., Hubert Waelrant's Bocedization (16th century), Daniel Hitzler's Bebization (17th century), and Carl Heinrich Graun's Damenization (18th century). See Bettie Jean Harden, "Solmization," The New Harvard Dictionary of Music, 759-60.
CHAPTER VI

THE GAMUT, MUTATION, AND MUSICA FICTA

Ramos was fully aware that his contemporaries would not accept his proposed method of solmization. In a parallel discussion, Ramos addresses the topics of musica ficta and mutation within the context of the Guidonian hexachord system by employing, for the sake of practicality, the traditional Guidonian syllables rather than those of his own solmization system.

In the Guidonian system, the location of the semitone is indicated by the position of the syllables mi-fa. With the rise of chromaticism, however, a repositioning of the semitone—in order to effect accidentals—came to be an integral part of the system. Singers, then, became accustomed to associating the syllable fa with b rotundum (♭) and mi with b quadratum (♯). The actual notation of the flat, sharp, or natural sign in the music itself was superfluous, for the syllables mi and fa served the same purpose.

In addition to the two most common signs of accidental inflection (i.e., b and ♯), composers often used the sign of the diesis (♯)—the precursor to our modern sharp sign (♯). While many theorists treated the signs of b quadratum and
the diesis as if they carried an identical function, these signs were originally employed to effect two different procedures. Ramos acknowledges all three of these signs, but his discussion of $b$ quadratum and the diesis reflects a view that, at least for the practicing musician, $b$ quadratum and the diesis carry the same meaning:

Therefore, whenever $fa$ should be made from $mi$ they write [it] down with such a sign—that is, round $\flat$; but whenever $mi$ should be made from $fa$ they indicate [it] with this sign—that is, square $\sharp$, or this [sign] $\natural$.\(^1\)

The confusion surrounding the distinction between $b$ quadratum and the diesis can be traced to the theoretical writings of Marchettus of Padua. In his Lucidarum in arte musicae planae (ca. 1317), Marchettus states that $b$ rotundum, $b$ quadratum, and the diesis each designate a specific type of music. Marchettus divides the whole tone into five parts, referring to each part as a diesis.

According to Marchettus, the signs of $b$ rotundum, $b$ quadratum, and the diesis represent three separate entities: an "enharmonic" semitone A to B♭ consisting of two dieses; a "diatonic" semitone B♭ to B♯ consisting of three dieses; and a "chromatic" semitone C to C♯ consisting of four dieses. Marchettus felt that the distinction of four dieses required the introduction of a new sign— the

\(^1\)Ramos de Pareia, Musica practica, 23.
Thus, for Marchettus, the flat sign denotes the enharmonic semitone (the minor semitone), the natural sign denotes the diatonic semitone (the major semitone), and the diesis (sharp) sign denotes the chromatic semitone.

One can easily trace the progression in fifteenth- and sixteenth-century theoretical writings with regard to the definition and use of these signs of inflection. In his Lucidario in musica (1545), Pietro Aaron refers to b quadratum as a "natural sign" (segno naturale) while b rotundum and the diesis are referred to as "accidental signs" (segni accidentali). Aaron notes that b quadratum is used to cancel the affect of b rotundum, while the diesis is used to raise the pitches C, F, or G by a semitone. Although Aaron represents a minority opinion, other fifteenth-century theorists, such as Giovanni Spataro and John Hothby, also embraced this doctrine for the application of accidental inflections.3

For Hothby, like most other theorists of the time, the definition of the term semitone does not reflect the present-day conception of "half of a whole tone," but rather that of an "imperfect tone." Thus, Hothby allows for semitones in a variety of sizes. He uses the three

---

2 Marchettus also referred to this sign as falsa musica. See Karol Berger, Musica Ficta: Theories of Accidental Inflections, 20-27.

3 Ibid.
properties of the hexachords—naturale, molle, and durum—to denote the properties of the available semitones, with the naturale semitone falling between E and F, the molle between A and B♭, and the durum between B♭ and C.

As an advocate of simplicity and practicality, Ramos attacks Hothby for his advancement of three different types of semitones. In his criticism of Hothby, Ramos quotes the polemic remarks of Johannes Carthusiensis, whose treatise *Ritus canendi vetustissimus et novus* contains a lengthy criticism against Marchettus's differentiation of the semitones:

But Brother Johannes Hothby, the English Carmelite who arranges the hard, the soft, and the natural semitone, perceived [it] by far the worst [of all]. Certainly he properly adopted the numbers for his monochord, since they are the same ones that Boethius arranges on his [monochord]. Nevertheless, I do not think that the difference of a semitone was taken from him, but from someone untrained. And let me say about [Hothby] that which Brother Johannes Carthusiensis was accustomed to saying of Marchettus. For it has not been heard for a long time [that one may] arrange the semitone in three ways, namely: chromatic, enharmonic, and also diatonic, because as [Johannes Carthusiensis] says: "Who has ever heard from some well-grounded teacher that there are three ways [to arrange] a semitone if not from this little Marchettus?" I believe that Brother Johannes Hothby may have taken some [of his] foundation from him. But I do not marvel [at this], because he is a follower of Guido. Truly, I wish to destroy the head, so that this body [of knowledge] undertaken in errors may become a corpse, and not be able to live [any] longer.5

---


5Ramos de Pareia, *Musica practica*, 32.
In the *Excitatio quaedam musicae artis per refutationem*, Hothby defends himself against Ramos's criticisms, claiming that Ramos misunderstands the intent. Hothby concurs that Marchettus's division of the whole tone into five dieses is an incorrect proposition; however, Hothby does not believe that a prohibition should be placed upon the use of Marchettus's categories for the semitone (i.e., *diatonic*, *enharmonic*, and *chromatic*), which, for Hothby, identify the size of a particular semitone. Hothby refers to the minor semitone as the *diatonic*, the major semitone as the *chromatic*, and the *diesis* as the *enharmonic*. Thus—unlike Ramos—Hothby, Spataro, and Aaron preserve the distinction between *b quadratum* and the *diesis* by preserving the differences between the semitones.

Ramos's discussion of the employment of the signs of inflection within key signatures is similar to that of his contemporaries:

Nevertheless, they say that if the sign is placed at the beginning [of the song], such an order should be observed throughout the entire song. But if it is not placed at the beginning but rather, along its course, they say that only the note where it is placed is subject to the law of that sign. Whence also they make various considerations in the raising and lowering of the notes— that is, from their proper position.

---


The Manus Perfecta

Ramos proposes the addition of several irregular hexachords (coniunctae) to create a "Guidonian" hand that contains twenty-two, rather than twenty, positions. This hand, the manus perfecta, spans a gamut of three octaves and a semitone—from F retropolis ("behind the thumb") to f♯ above e la superacutae. Ramos notes the error of those who propose that the three-octave manus perfecta holds the quality of divine tripartite perfection; the error of this misinterpretation rests upon the fact that the gamut is actually three diapasons plus a semitone (the distance from e la sol superacutae to f la superacutae being that of a tone rather than a semitone). Ramos notes that if the distance between e la sol superacutae and f la superacutae were the distance of a semitone, it would be contrary to the method of Guido because—according to Guido—the interval of sol to la is the distance of a tone. Ramos explains that, in truth, the manus perfecta is "perfect" because the "entire hand has been correctly divided by means of the semitones."

Ramos constructs the "perfect hand" by combining three separate hands, each comprised of seven hexachords (see Figure 6). Ramos combines the seven regular hexachords of

---

8Ibid.
9Ibid., 24.
Figure 6. Figura 4 of the Musica practica, 28.
Source: Johannes Wolf, ed., Musica practica, 35.
the Guidonian hand (the ordo naturalis) with a hand that contains seven irregular hexachords (the ordo accidentalis dexter, or "right accidental order") positioned a whole tone below those deductiones of the Guidonian hand (F below F, bb, eb, f, bb1 eb1, f1); to these, Ramos adds a hand that contains seven irregular hexachords (the ordo accidentalis sinister or "left accidental order") a whole tone above those of the Guidonian hand (A, d, g, a, d1, g1, a1).10

Ramos's Discussion of Mutation

Ramos begins his discussion of mutation by providing a definition from Tinctoris's Terminorum musicae diffinitorium: "Mutation is the variation of one voice for another."11 Later, for the sake of clarification, Ramos provides a second definition of mutation: "Mutation is the variation of two equal notes interchanged with one another by means of diverse properties on one sign and one note."12 Thus, mutation is the means by which a performer can transfer from one hexachord to another by substituting a

10The designations of "right" and "left" accidental orders may be somewhat confusing; whenever Ramos refers to "its right side," he is referring to the diagram from the teacher's perspective, as if the diagram were being handed to the student for examination. Thus, the "left accidental order" is actually located to the right of the reader.


12Ibid.
syllable of the new hexachord for one of the old hexachord. Ramos explains two situations in which a performer might choose to make a mutation: "either out of necessity for ascending or descending" or "for the purpose of placing a semitone before or after [a note]."\textsuperscript{13} In the first case, the performer uses mutation to extend the range when the notes exceed the ambitus of a particular hexachord; in the second case, the performer uses mutation to perform an accidental inflection of \textit{musica ficta}.

The subject of mutation received a great amount of consideration in fifteenth-century music literature. The practice itself is divided into two categories: \textit{explicita} or \textit{vocalis}, and \textit{implicita} or \textit{mentalis}.\textsuperscript{14} The first type of mutation, "explicit" mutation, results when the singer pronounces the syllables of both hexachords. In the following phrase, an explicit mutation is made when both sol and fa are pronounced on C:

\begin{figure}[h]
\centering
\includegraphics[width=0.8\textwidth]{explicit-mutation.png}
\caption{Explicit Mutation}
\end{figure}

\begin{verbatim}
\textit{ut re mi fa sol-fa mi fa sol}
\end{verbatim}

\textsuperscript{13}Ibid.

\textsuperscript{14}Karol Berger, \textit{Musica Ficta: Theories of Accidental Inflections}, 7.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Thus, on the fifth pitch of this exercise, the singer pronounces the syllable sol of the F hexachord and then immediately changes to the syllable fa of the G hexachord in order to effect the necessary alteration required by the accidental that follows. In actual practice, the implementation of explicit mutation seems a bit cumbersome; in the classroom, however, it enables the student to demonstrate his comprehension of mutation.

"Implicit" mutation results when the singer casts aside the first syllable of the mutation and effects the procedure mentally, thereby pronouncing only the second syllable. In the following phrase, the singer would replace sol with fa, pronouncing only the fa of the G hexachord:

\[
\text{ut re mi fa fa mi fa sol}
\]

Figure 8. Implicit Mutation

The advantage of this type of mutation is obvious; it does not affect the rhythm of measured music, whereas the method of explicit mutation obstructs the rhythmic flow of the phrase.

Ramos implies that implicit mutation was customarily used by Guido and his followers to effect a mutation by
abandoning the first syllable and pronouncing only the second. Ramos advocates the method of explicit mutation during the initial instruction of students, yet demonstrates a degree of flexibility for those who are more advanced:

And yet, let not the students be forced to do this, since sometimes we permit [them] to say one in place of the other.\textsuperscript{15}

Ramos reinforces his position against multiple mutations, advising his students to make the accidental inflections of the tones and semitones by following the rules of \textit{musica ficta}:

But let them only become accustomed to noticing the rules mentioned above—that is, to observe the species of the tone or of the semitones, so that they do not perform one in place of another as it occurs in singing with solmization—as they say—according to the syllables of Guido.\textsuperscript{16}

In Part 1, Treatise 2, Chapter 5, Ramos identifies disiuncta—the antithesis of coniuncta—as the process of an abrupt transition between two hexachords due to the absence of a pivotal note; in other words, a disiuncta occurs when no mutation can be made. Such a transition is necessary to sing certain melodic intervals such as the augmented second, the tritone, the minor sixth, and the somewhat rare major semitone, (e.g., $Bb$ to $B\#$). According to Ramos, disiuncta must be employed only as a last resort, i.e., when it is absolutely impossible to effect a mutation.

\textsuperscript{15}Ramos de Pareia, \textit{Musica practica}, 34.

\textsuperscript{16}Ibid.
Ramos's Discussion of Musica Ficta

An all-encompassing definition for the term musica ficta continues to elude musicologists; due to the variety of musical ramifications, both melodic and harmonic, even the most general definition is apt to be flawed. The meaning of this term can be grasped only by examining theoretical evidence; even then it is a slippery grasp at best, since many inconsistencies arise among the authors of the various musical treatises.

Ramos's discussion of musica ficta is dependent upon an understanding of Guidonian practice. The pitches contained within the Guidonian hand are solmizated with the syllables of the seven deductiones and are regarded as musica recta or musica vera. The pitches that fall outside the hand—pitches that are not normally a part of the deductiones—are regarded as musica ficta or musica falsa.¹⁷

The technique of musica ficta was incorporated by early musicians to effect an inflection of pitch during performance. This inflection was based upon various rules that were held in the mind of the singer, and may or may not have been explicitly indicated by the notation. Quite apart from the specificity of notation in the Common Practice

¹⁷Other less frequently used synonyms for pitches that lie outside the hand include musica acquisita (acquired music), musica colorata (colored music), and musica coniuncta (conjunct music).
Period, the Medieval-Renaissance musician approached the inflections of sharp, natural, and flat as a mental/aural exercise.

In his proposed method of solmization, Ramos introduces the use of "\( b \) is" to signify the \( b \) rotundum of the conjunct tetrachord, and "\( \# \) is" to signify the \( b \) quadratum of the disjunct tetrachord. Later, however, Ramos returns to the Guidonian syllables in order to provide the practicing musician with a definition of musica ficta:

With these signs the singers signal tones or semitones, not only on paramese, but on other places as well. For they say: "Wherever \( fa \) is found without \( mi \), \( mi \) should be made there, as in \( b \ fa \# mi \); likewise [this also holds true] where \( mi \) [is found] without \( fa \), which many [people] call musica ficta.\(^{18}\)

In Part 1, Treatise 2, Chapter 2—a chapter devoted to the topic of musica ficta—Ramos expresses his disagreement with Philipetus on the matters of musica ficta. Philipetus asserts that musica ficta is made in only one manner; Ramos demonstrates that ficta can occur by at least two means, because "a different method was [used] to make \( fa \) from \( mi \) than that which [was used] to make \( mi \) from \( fa \)."\(^{19}\) Thus, Ramos refers to the use of \( b \) rotundum whenever \( mi \) is changed into \( fa \) and the use of \( b \) quadratum or the diesis whenever \( fa \) is changed into \( mi \).

---

\(^{18}\)Ramos de Pareia, Musica practica, 23.

\(^{19}\)Ibid.
Ramos's suggestion of replacing *mi* with *fa* and vice-versa demonstrates his desire to continue the long-held theoretical prohibition of singing *mi contra fa* in a vertical sonority. To follow this rule, every hexachord position that contains *mi* would also be required to contain *fa*; likewise, every hexachord position that contains *fa* must contain *mi*. If *mi* is to be substituted at the locations of *fa*, then the pitches C♯ and F♯ are required; if *fa* is to be substituted at the locations of *mi*, the pitches Ab and Eb result. Due to the fact that B♭ is already a part of *musica recta*, this expansion of the semitones would result in a gamut containing twelve pitches: C, C♯, D, Eb, E, F, F♯, G, Ab, A, B♭, and B. Thus, Ramos's system effects the use of *b rotundum* in five positions (*b mi, e la mi, a la mi re, e la mi acutae* and the *second a la mi re*), and the use of *b quadratum* or the *diesis* in an additional five positions (*c fa ut, f fa ut, c sol fa ut, f fa ut acutae, and c sol fa*). Ramos was not alone in his proposition of a gamut that incorporated more than six steps. In his *Calliopea legale*,

---

20 The *mi contra fa* rule was one of the most important principles of *musica ficta*. In order to avoid the prohibited harmonic intervals of augmented and diminished fourths, fifths, and octaves, the performer employed the inflections of *musica ficta*. The augmented fourth from F (fa) to B♭ (mi) could be avoided by changing the *mi* to *fa*, resulting in the interval F to B♭; the *fa* could be changed to *mi*, resulting in the interval of F♯ to B♭, etc.

Hothby proposes a sixteen-step gamut containing the pitches C, C♯, Db, D, D♯, Eb, E, F, F♯, Gb, G, G♯, Ab, A, B♭, and B. Hothby's procedure, in which a specific designation is assigned to each sign of inflection, reflects the increasing tendency for theorists in the late fifteenth- and early sixteenth-centuries to relate the gamut to the keyboard. Hothby considers the white keys of the keyboard to be representative of the "natural" pitches and of the first ordine (order), whereas the black keys are divided into either the second or third order according to their employment as flat and sharp signs, respectively. Hothby permits the application of the flat or sharp sign on every note with five exceptions: the flat sign may not be attached to C and F, while the sharp sign may not be attached to A, B or E.²²

Ramos takes issue with those who produce a sixteen-step gamut by placing b rotundum and b quadratum in positions where neither fa nor mi can be found. Such an arrangement was advocated by Hothby with the proposition of his three ordines, and it is likely that the person to whom Ramos refers to as "Johannes de Londonis" is none other than Hothby; throughout the rest of the treatise Ramos refers to Hothby as "Johannes Ottobi."

²²Karol Berger, Musica Ficta: Theories of Accidental Inflections, 36.
Ramos allows that such an arrangement of a sixteen-step gamut can be made in speculative theory, but dismisses its usefulness in practical application. Ramos reasons that the additional inflections of the sixteen-step gamut are superfluous, because the whole tone has already been divided into two semitones by means of the twelve-step gamut:

However, Johannes of London and others less experienced say: "Just as both signs can be placed on b fa t mi, thus also [it may be done] on other positions where [there is] neither fa nor mi." By no means should it be denied that it can be done in such a manner, but I do not think that it should be resorted to. Consequently, on that account and according to [that which] has already been said, if a tone remains divided into two semitones, by [this] error the rest of them become useless.23

Ramos sees no advantage in employing the additional four notes (Db, D#, Gb, G#) that are created by a sixteen-step gamut; for the sixteen-step gamut requires the employment of four split keys (C#/Db, D#/Eb, F#/Gb, and G#/Ab). Ramos firmly disapproves of split keys on keyboard instruments, and he intentionally avoids them in his own tuning method. His position on enharmonic strings and split keys is demonstrated in his explicit statements against the implementation of enharmonic equivalent pitches for Ab, Eb, and F# (see Chapter IV of this commentary).24

23Ramos de Pareia, Musica practica, 31.

24It is quite possible that Ramos may have recognized that the acceptance of a sixteen-step gamut would have negated his own proposed division of the monochord and his new method of tuning.
Following his explanation of ficta, Ramos provides a discourse on the coniuncta:

They also call this coniuncta, because just as when tritē synēmmenōn is placed after mesē--for which reason the tone [between] mesē and paramesē must be divided into two semitones--thus also any other tone located elsewhere should be divided. And furthermore, they instruct us: "Any of these coniunctae is a hexachord, just as the others that were arranged previously," and therefore, just as after f fa ut (on which it is called ut), g sol re ut follows--where ut is placed again according to [those things which have] already been said; likewise also, in each one of the positions. And they define [it] in this way: "Coniuncta is [the method of] making a tone from a semitone and a semitone from a tone; thus also, making a ditone from a semiditone and a semiditone from a ditone, and similarly concerning the other species."

And thus they speak correctly, because these coniuncta hexachords behave in the same way as the diezeugmenōn and synēmmenōn tetrachords.25

Confusion may arise from Ramos's use of the word coniuncta, here employed in several capacities. The term coniuncta is used by Ramos to denote the conjunct synēmmenōn tetrachord; this use of the term is not unusual given that the synēmmenōn tetrachord contains the accidental B♭. The term is also used by Ramos in reference to the implementation of the ficta pitches themselves: "Nevertheless, they do not have the coniunctae notes of square ἰ or of soft ᶝ below proslambanomenos. . . ."26 And, finally, the term coniunctae is used by Ramos to represent the irregular hexachords that contain ficta pitches, such as those that

---

25Ibid., 23.

26Ibid., 29.
appear in the manus perfecta: "Any of these coniunctae is a hexachord. . . ."²⁷

The application of coniuncta as a chromatic inflection is defined by the new location of the semitone mi-fa; however, the point at which the coniuncta is executed may result in two different hexachords, depending upon which pitch of the selected interval is altered. A coniuncta of mi-fa, for example, could be executed between the pitches G-A to suggest either the semitone G♯-A (which implies that the hexachord is built upon E), or the semitone G-Ab (which implies that the hexachord is built upon Eb). According to Hothby's sixteen-step gamut, either of these procedures would be a viable option for the application of coniuncta; due to the fact that his twelve-step gamut does not contain G♯, only the latter would be acceptable for Ramos.

Ramos opposes the definition of coniuncta that appears in Tinctoris's Terminorum musicae diffinitorium: "Coniuncta is the position of b or 1 in an irregular place."²⁸ Ramos notes that the application of b rotundum or b quadratum to a step that is already fa or mi does not affect the pitch and, therefore, Tinctoris's definition is faulty in that it may lead to the wrong conclusion:

²⁷Ibid., 23.

²⁸Johannes Tinctoris, Terminorum musicae diffinitorium, s.v. "Coniuncta," a4v.
Johannes Tinctoris—far removed from the true knowledge—states thus: "Coniuncta is the position of b or f in an irregular place." For if the soft b sign were placed on c sol fa ut, or in another position where fa was, it would be placed irregularly, and yet it would not be coniuncta; likewise, if square f were placed where mi had been. But if b is placed on b mi, coniuncta is made, and in the end it is an irregular place for [b]b, since it is an octave to round b.29

The Concept of the Subintellectus

To provide a clearer understanding of the application of musica ficta, Ramos offers several examples in which he demonstrates the accidental inflections that can be effected through the application of Guido's solmization syllables. In Part 1, Treatise 2, Chapter 7, Ramos draws attention to the remark by Johannes of Villanova that "the song prefers for the note to be made hard while ascending and to be made soft while descending."30 Ramos clarifies the meaning of this remark through an illustration, suggesting that the song is "sweeter" when it is made to ascend as F G A Bb C, rather than when it is made to ascend as F G A Bf C.31

Ramos further demonstrates the applications of musica ficta through the implementation of the subintellectus. According to Ramos, the ditonus subintellectus (lit., "perceived ditone") is a notated semiditone that is perceived as a ditone. To illustrate the concept of the

29Ramos de Pareia, Musica practica, 23-24.
30Ibid., 33.
31Ibid., 39.
subintellecutus, Ramos discusses a phrase containing the pitches A C D. According to Guido's method of solmization, this phrase would be sung on the G hexachord with the syllables re fa sol; Ramos, however, suggests that if the singer does not return to the pitch C after he has sung D, then the C should be raised to C♯ and the syllables should be sung according to an A hexachord on ut mi fa (A C♯ D). Ramos also provides an alternative to this suggested approach by allowing the singer to perform the phrase A C♯ D with the syllables re fa sol, provided that the performer understands the theoretical justification for the transformation from a semiditone to a ditone (here, A–C♯ instead of A–C) by means of the subintellecutus.

Ramos likewise provides two examples for employing the semitonus subintellecutus (lit., "perceived semitone"). First, he discusses the notated pitches G F G where the application of musica ficta for causa pulchritudinis results in the pitches being performed as G F♯ G. He explains that the use of the semitonus subintellecutus, in this instance, will allow for the employment of the solmization syllables sol fa sol or re ut re; here is an example where an accidental inflection is made from F to F♯, but the syllables themselves do not reveal the half-step movement. Ramos's approach is obviously contrary to that of Guido and his followers, who teach that the syllables sol fa sol or re ut re always indicate movement by whole steps; for the
Guidonians, only the syllables mi-fa may effect a half-step inflection.

In a second example, Ramos applies the *semitonus subintellectus* to the phrase $D B C D C D D$, resulting in a melodic transformation of $D B C\# D C\# D D$. Here again, the inflection of pitch is perceived by the ear without the traditional employment of the Guidonian syllables *mi-fa*. For those who wish to continue the Guidonian tradition of employing *mi-fa* at half-step locations, Ramos offers the alternative of substituting *re* for *mi* on the pitch $B$—effecting a hexachord on $A$—which allows for an accidental inflection on $C$ with the Guidonian syllables *mi-fa*:

\[
\begin{align*}
\text{sol mi-re mi fa mi fa fa}
\end{align*}
\]

*Figure 9. The Semitone Subintellectus*

Finally, Ramos provides an example of the *semiditonus subintellectus* (lit., "perceived semiditone") in a phrase where the singer performs the vocables *la fa sol sol*. Through the employment of the *semiditonus subintellectus*, his example on a $C$ hexachord effects the pitches $A F\# G G$ (*la fa sol sol*). Here, *la* to *fa* is performed as a *semiditonus subintellectus*, whereas in Guidonian

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
solmization, the leap from la to fa represents the interval of a ditone. Alternatively, Ramos suggests that the singer could make an explicit mutation by pronouncing both la and sol, so that by means of a mutation from a hexachord on C to a hexachord on D, the phrase could be sung in the following manner:

\[
\text{Figure 10. The Semiditonus Subintellectus}
\]

**Conclusion**

In the situations that call for the melodic application of the semitone by means of musica ficta Ramos remains a traditionalist; his concept of the subintellectus, however, allows him to deviate, when necessary, from the conventional applications of solmization espoused by Guido and his followers. Such a separation from Guidonian tradition is representative of Ramos's life-long struggle against Guido's mandate of mi-fa as the only position for the semitone's existence. Through the introduction of a perceptual understanding of accidental inflection, Ramos simplifies the task of mutation by allowing the semitone's existence at other syllabic positions.
In the concept of the *subintellectus* Ramos has discovered an ideal tool that may be applied to his own solmization system (where the performer is restricted to a single mutation at the octave) as well as to the Guidonian system with its multiple mutations. For Ramos, the employment of the perceptual concept of the *subintellectus* is preferred over the constant syllabic exchanges that accompany multiple mutations. By avoiding the unnecessary complications created by multiple mutations, Ramos offers the practicing musician a system of mutation that is directly applicable to the chromatic music of the fifteenth century.
CHAPTER VII
THE MODES

Part 1, Treatise 3 of the Musica practica is devoted to a traditional explanation of the modes and related issues. After a discussion of the various species of the diatessaron and the diapente, Ramos proceeds with a discussion of the eight species of the diapason from which he demonstrates the origin of the modes.

Although his contemporaries consider the modes to be eight in number, Ramos recalls the earlier tradition of numbering the modes from one to four, noting the combination of the Greek designations (protus, deuterus, tritus, tetrardus) with their authentic and plagal delineations. In addition, Ramos discusses Boethius's distinctive names for the modes that were applied according to the particular groups of people who found pleasure in them (i.e., Dorian, Phrygian, Lydian, and Mixolydian). Table 17 illustrates the eight modes and their construction according to the various species combinations of the diatessaron and diapente.

In medieval physiology, the four natural dispositions of man were associated with the four fluids of the human

---

Ramos continues to advance the typical medieval explanation concerning the derivation of the plagal variants through the inversion of the diapente and the diatessaron species.
TABLE 17
THE EIGHT MODES ACCORDING TO RAMOS²

<table>
<thead>
<tr>
<th>Mode</th>
<th>Range and String</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorian</td>
<td>d-1 1st diapente</td>
<td>+ 1st diatessaron</td>
</tr>
<tr>
<td></td>
<td>lichanos hypatōn (d-h)</td>
<td>+ (h-l)</td>
</tr>
<tr>
<td>Hypodorian</td>
<td>a-h 1st diatessaron</td>
<td>+ 1st diapente</td>
</tr>
<tr>
<td></td>
<td>proslambanomenos (a-d)</td>
<td>+ (d-h)</td>
</tr>
<tr>
<td>Phrygian</td>
<td>e-m 2nd diapente</td>
<td>+ 2nd diatessaron</td>
</tr>
<tr>
<td></td>
<td>hypatē meson (e-†)</td>
<td>+ (†-m)</td>
</tr>
<tr>
<td>Hypophrygian</td>
<td>b-† 2nd diatessaron</td>
<td>+ 2nd diapente</td>
</tr>
<tr>
<td></td>
<td>hypatē hypatōn (b-e)</td>
<td>+ (e-†)</td>
</tr>
<tr>
<td>Lydian</td>
<td>f-n 3rd diapente</td>
<td>+ 3rd diatessaron</td>
</tr>
<tr>
<td></td>
<td>parhypatē meson (f-k)</td>
<td>+ (k-n)</td>
</tr>
<tr>
<td>Hypolydian</td>
<td>c-k 3rd diatessaron</td>
<td>+ 3rd diapente</td>
</tr>
<tr>
<td></td>
<td>parhypatē hypatōn (c-f)</td>
<td>+ (f-k)</td>
</tr>
<tr>
<td>Mixolydian</td>
<td>g-o 4th diapente</td>
<td>+ 1st diatessaron</td>
</tr>
<tr>
<td></td>
<td>lichanos meson (g-l)</td>
<td>+ (l-o)</td>
</tr>
<tr>
<td>Hypermixolydian</td>
<td>d-l 1st diatessaron</td>
<td>+ 4th diapente</td>
</tr>
<tr>
<td></td>
<td>mesē (d-g)</td>
<td>+ (g-l)</td>
</tr>
</tbody>
</table>

²Ramos uses the letters a-q to delineate the octave designation of pitches in his monochord division; thus, h is simply the pitch a one octave higher.
body: phlegm, choler, blood, and black bile. Accordingly, the dominance of one of these fluids was thought to affect the character and general health of man. Thus, one's emotional disposition might be described as phlegmatic (slow and stolid), choleric (angry and irate), sanguineous (bitter and bloodthirsty), or melancholic (sad and depressed).

To demonstrate the correspondence between musica instrumentalis and musica humana, Ramos discusses how the modes influence the character of man. He assigns a particular affection to each mode, along with a representative color. For the most part, the correlations between the modes and the bodily humors are taken directly from Chapter 1 of Boethius's De institutione musica, with occasional quotations concerning their qualities extracted from the writings of St. Augustine, Ambrose, and Lodovicus of Sanchez.

---

3In Part 1, Treatise 1, Chapter 1 of the Musica practica, Ramos provides the traditional medieval three-fold delineation of music: musica mundana, musica humana, and musica instrumentalis. Ramos is referring to that which was discussed in greater depth by Boethius in the De institutione musica (see Book I, Chapter 3). Briefly, musica mundana refers to the "cosmic music" that is brought about by the celestial revolutions of the planets; musica humana refers to the "human music" that intermingles the elements of the body and holds the parts of the body in an established order; and musica instrumentalis refers to the sounds that are produced by means of various instruments. Ramos was mainly concerned with musica instrumentalis due to its ultimate end in his division of the monochord, but he also touches upon aspects of musica humana due to its connection with the modal affections.
<table>
<thead>
<tr>
<th>Mode</th>
<th>Affection</th>
<th>Color</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dorian</td>
<td>phlegm</td>
<td>crystal</td>
<td>awakens the drowsing man; purges the stupor and confusion of sleep</td>
</tr>
<tr>
<td>Hypodorian</td>
<td>phlegm</td>
<td>crystal</td>
<td>induces drowsiness; used by the Pythagoreans to assist in falling asleep</td>
</tr>
<tr>
<td>Phrygian</td>
<td>choler</td>
<td>fire</td>
<td>inspires anger; for men with arrogant and destructive temperaments</td>
</tr>
<tr>
<td>Hypophrygian</td>
<td>choler</td>
<td>fire</td>
<td>licentious and flattering, but lacking any real beauty; sometimes exciting</td>
</tr>
<tr>
<td>Lydian</td>
<td>blood</td>
<td>blood</td>
<td>delightful, modest, and joyful; appropriate for leaping-style dances</td>
</tr>
<tr>
<td>Hypolydian</td>
<td>blood</td>
<td>blood</td>
<td>pious and lamentable; capable of bringing one to tears</td>
</tr>
<tr>
<td>Mixolydian</td>
<td>melancholy</td>
<td>yellow-crystal</td>
<td>frivolous and joyful; a reminiscence of adolescence</td>
</tr>
<tr>
<td>Hypermixolydian</td>
<td>melancholy</td>
<td>yellow-crystal</td>
<td>gentle, mannered, and slow; serving as a representative of distinguished men</td>
</tr>
</tbody>
</table>
As did many theorists, Ramos believed that the modes could induce a certain type of disposition as well as alter an existing one. As proof of this, Ramos recalls an ancient Greek myth related by Boethius in *De institutione musica*. (Supposedly, an intoxicated young man of Tauromenium became so enraged and excited upon hearing the Phrygian mode that he threatened to break down the doors to the house of a prostitute. The young man's disposition was eventually tempered when Pythagoras, having learned of the youth's state of mind, ordered the musicians to change the mode to the more calming affects of Hypodorian.)

Having demonstrated the relationship between *musica instrumentalis* and *musica humana*, Ramos proceeds to demonstrate the relationship between *musica instrumentalis* and *musica mundana* by establishing a correlation between the strings of the Greek lyre, the planets, the modes, and the Muses.⁴

⁴Ramos specifically credits Marcus Tullius Cicero for this planet-string arrangement, having extracted it from the *De re publica* (Book VI, Chapter 18). A loyal disciple of Boethius, this is one of the few instances in which Ramos departs from Boethius's explanations of traditional concepts; in Book I, Chapter 27 of the *De institutione musica*, Boethius proposes a different arrangement of the Greek string names and their corresponding planets: *hypatē mesōn* is assigned to Saturn, *parhypatē mesōn* to Jupiter, *lichanos mesōn* to Mars, *mesē* to the sun, *trite synēmmenōn* to Venus, *paranēte synēmmenōn* to Mercury, and *nēte synēmmenōn* to the orbit of the moon.
<table>
<thead>
<tr>
<th>String (or Modality)</th>
<th>Planet</th>
<th>Mode</th>
<th>Muse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proslambanomenos</td>
<td>Moon</td>
<td>Hypodorian</td>
<td>Clio</td>
</tr>
<tr>
<td>Hypatē Hypatōn</td>
<td>Mercury</td>
<td>Hypophrygian</td>
<td>Calliope</td>
</tr>
<tr>
<td>Parhypatē Hypatōn</td>
<td>Venus</td>
<td>Hypolydian</td>
<td>Terpsichore</td>
</tr>
<tr>
<td>Lichanos Hypatōn</td>
<td>Sun</td>
<td>Dorian</td>
<td>Melpomene</td>
</tr>
<tr>
<td>Hypatē Mesōn</td>
<td>Mars</td>
<td>Phrygian</td>
<td>Erato</td>
</tr>
<tr>
<td>Parhypatē Mesōn</td>
<td>Jupiter</td>
<td>Lydian</td>
<td>Euterpe</td>
</tr>
<tr>
<td>Lichanos Mesōn</td>
<td>Saturn</td>
<td>Mixolydian</td>
<td>Polyhymnia</td>
</tr>
<tr>
<td>Mesē</td>
<td>Firmament</td>
<td>Hypermixolydian</td>
<td>Urania</td>
</tr>
</tbody>
</table>
Because Ramos clearly describes the eighth mode as a plagal mode brought about through the combination of the first species of the diatessaron and the fourth species of the diapente, one may question why Ramos calls the eighth mode *Hypermixolydian* rather than *Hypomixolydian*. Such an appellation of Hypermixolydian results from Ramos's desire to assign the names of the Greek strings to specific planets, and then to assign the names of the planets to specific modes. As is illustrated in Table 17, both the Dorian and the Hypermixolydian modes contain the outer range of d-1; the difference between these modes occurs in their species combinations. The fourth species of the diapason, i.e., the Dorian mode, has already been assigned to *lichanos hypatōn* (d). Ramos cannot use the normal Hypo- designation for the plagal counterpart of the Mixolydian mode because it would require him to place a second mode upon *lichanos hypatōn*.

In traditional chant theory, the range of the Hypomixolydian modal scale is situated one whole step above the Hypolydian and has the same range and register as the Dorian. Because the eighth mode is actually placed "above" the Mixolydian, Ramos prefers to call it by the name Hypermixolydian. This appellation of Hyper- allows him to place the eighth mode on *mesē*—that is, "above" the Mixolydian's string assignment of *lichanos mesōn*. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
In assigning the Hypermixolydian designation to the eighth mode, Ramos once again echoes the ideas of Boethius. The use of the eighth mode not only serves to strengthen Ramos's defense of the number eight, the octave, and the octochord; but it is yet another validation for the correlations between the planets and the Muses.

Ramos promises to continue his treatment of musica humana and musica mundana in the second and third volumes; unfortunately, these were never completed and his promise remained unfulfilled. Nevertheless, by means of an intricate illustration of interlocking spirals, Ramos demonstrates the correspondence between the Greek strings, the modes, the planets, and the Muses (see Figure 11). It is interesting to note that Franchinus Gaffurius offers a similar illustration as the frontispiece to the Practica musicae (see Figure 12). Although Gaffurius's woodcut does not include the spirals found in Ramos's illustration, the correspondence between the two illustrations appears significant. It is possible that Gaffurius "borrowed" this

---


Figure 11. Figura 7 of the Musica practica.
Source: Johannes Wolf, ed., Musica practica, 61.
Figure 12. Frontispiece to Gaffurius's Practica musicae.
illustration from Ramos; Gaffurius's treatise was published in 1496, fourteen years after the publication of the Musica practica of Ramos. It is well-known that Gaffurius was acquainted with the Musica practica; he had returned a borrowed copy of Ramos's treatise to Spataro with numerous handwritten annotations in the margins. Gaffurius often fails to credit the sources of his ideas (e.g., Cicero's planetary-mode correlation or Martianus Capella's Muse-mode correlation), and thus it is not surprising that Gaffurius would fail to credit his greatest rival—Bartolomeo Ramos, who may have been the source of inspiration for this famous woodcut. 

Conclusion

Ramos's traditional explanation of the modes demonstrates his propensity to follow the conventions established by the ancients; his correlations of the strings to the planets, modes, and Muses retain the traditional three-fold delineation of music: musica instrumentalis, musica humana, and musica mundana. Ramos's failure to follow Boethius's arrangement of the Greek string names with their corresponding planets, however, demonstrates that

---

Ramos's loyalty to Boethius does not necessarily preclude independent thought. Further, his elaboration on Boethius's description of the modal affections provides the reader with some idea of how he may have lectured on Boethius while teaching at the University of Salamanca; such descriptions and embellishments of Boethian theory may have also been contained in the treatise written in Spanish, no longer extant. The citations in the *Musica practica* that have been extracted from the writings of Boethius, Cicero, Capella, Augustine, and Ambrose clearly demonstrate that Ramos was acquainted with the writings of the auctoritas; their inclusion may, in fact, be the manifestation of Ramos's intense personal struggle to establish himself as a learned man in the community of fifteenth-century scholars.
CHAPTER VIII

COUNTERPOINT

No music treatise of the Renaissance would be complete without a classification of the intervals and a discussion of their practical application to composition. From even a cursory glance at Part 2 of the Musica practica, it is evident that Ramos perpetuates many of the earlier traditions of contrapuntal composition; his discussion regarding the use of the tritone and imitative writing, however, exhibits rather progressive thought.

Consonance and Dissonance

In Part 2, Chapter 1, Ramos arranges the simple intervals into categories of consonance and dissonance. Following the typical fifteenth-century conventions, Ramos identifies the consonant intervals to be the perfect octave, the perfect fifth, the major and minor thirds, and the major and minor sixths. Intervals falling into the category of dissonance include the augmented fourth, the major and minor seconds, and the major and minor sevenths. The compound intervals extending from the ninth to the twenty-second are explained as replications of the intervals that fall within the first octave; thus, those intervals that are contained within the first octave are designated as simple, those
within the second octave as compound, and those within the third octave as decompound.

Ramos describes the unison as the "source and origin of consonance" but, unlike many of his predecessors, he excludes it from the category of consonance:

Moreover, there is no doubt for anyone concerning the unison, since the same does not differ from itself. For that reason, it is not reckoned among the consonances, because a consonance is not a concord of similar things but of dissimilar things made into one . . . .

Ramos further divides the consonances into perfect and imperfect species. According to Ramos, the fifth and the octave are perfect because they become dissonant whenever they receive augmentation or diminution by a semitone; thirds and sixths are imperfect, however, because they retain their consonant quality even with the addition or subtraction of a semitone.

In his discussion of interval inversion, Ramos sidesteps the controversial issue of why the perfect fourth is considered a consonant interval when it serves as the upper constituent of a composite harmony, but is classified as a dissonant interval whenever it stands alone. Ramos further avoids the difficult issue of why thirds and sixths can be inverted and retain the quality of imperfect consonance, whereas the inverted perfect fourth and fifth are considered as consonant and dissonant intervals,

\[1\text{Ramos de Pareia, }\textit{Musica practica}, 49.\]
respectively, even though both are said to be "perfect." Although he promises to address both of these issues in forthcoming discussions, Ramos conveniently fails to return to these matters in the Musica practica.

The Rules of First Species Counterpoint

Ramos's six rules for note-against-note counterpoint represent no departure from late fifteenth-century practice. An amplification of each rule is provided by way of a brief discussion and by musical examples that are stated in prose.

A comparison of the teaching of Ramos with that of his archenemy, Gaffurius, demonstrates Ramos's conservative attitude with respect to counterpoint. In Book II of the Practica musicae (1496), Gaffurius provides "eight mandates" of counterpoint which, with some slight alterations, reiterate the six rules given by Ramos in the Musica practica (1482); however, Gaffurius's alterations point to Ramos as the conservative on matters of counterpoint (see Table 20).

---

2See also Nicolaus Burtius's discussion of counterpoint in the Musices opusculum (1487). Burtius gives five precepts of counterpoint that resemble the six rules discussed by Ramos.

3Appendix A of this dissertation provides notated examples to illustrate Ramos's verbal explanations of first species counterpoint.
<table>
<thead>
<tr>
<th>Rule 1:</th>
<th>Begin &amp; end on a perfect species or unison.</th>
<th>Rule 1:</th>
<th>Begin with a perfect interval.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule 2:</td>
<td>Avoid parallel octaves, fifths, and unisons.</td>
<td>Rule 2:</td>
<td>Avoid parallel perfect intervals of the same kind.</td>
</tr>
<tr>
<td>Rule 3:</td>
<td>Two or more imperfect consonances may follow one another.</td>
<td>Rule 3:</td>
<td>Successive thirds and sixths should be limited to only four successions.</td>
</tr>
</tbody>
</table>

| Rule 4: If one voice remains on a pitch for two or more note values, the other voice must move. | Rule 4: Two perfect intervals of different kinds (e.g., the perfect octave and perfect fifth) may follow one another. |
| Rule 5: M6 resolves to P8; m6 and M3 resolve to P5; m3 resolves to unison. | Rule 5: Two perfect intervals of the same kind may follow one another provided that the voices cross. |
| Rule 6: If the tenor ascends, the counterpoint should descend, i.e., contrary motion should prevail. | Rule 6: If the tenor ascends, the counterpoint should descend; likewise, if the tenor descends, the counterpoint should ascend. |
| Rule 7: Contrary motion should prevail when approaching perfect intervals and cadences. | |

Ramos omits this rule in his initial explanation, but addresses it in a subsequent discussion of the second rule.
In Part 2, Treatise 1, Chapter 2, Ramos examines the rules of counterpoint proposed by Ugolino of Orvieto in the Declaratio musicae disciplinae. Reiterating Ugolino’s fourteen rules nearly word for word, Ramos discusses the validity of their application to every interval species from the unison to the fifteenth, notes subtle points of disagreement, and even provides the reader with specific musical examples of what he himself considers to be "good" and "bad" counterpoint.6

The Practical Use of the Tritone

A significant difference occurs between Gaffurius and Ramos in the handling of the tritone. In this respect, Ramos is clearly the more progressive theorist. In Part 1, Treatise 2, Chapter 8, Ramos makes an astonishing statement with regard to the tritone: "To make a tritone . . . is not a mortal sin as many believe."7

In a previous discourse on the divisions of the diapason, Ramos divides the octave by means of the tritone (i.e., the augmented fourth) and the semidiapente (i.e., the diminished fifth). He observes that, to the performer

6 Appendix C of this dissertation provides notated examples to illustrate Ramos's verbal explanations of "good" and "bad" counterpoint. The reader is urged to compare Ramos's contrapuntal rules and illustrations with those of Ugolino's Declaratio musicae disciplinae, Book II, Chapter 26, which are provided in Appendix D.

7 Ramos de Pareia, Musica practica, 39.
interested only in sound, there appears to be no difference between the tritone and the semidiapente; to the theorist, concerned with the complicated speculations that result from the various sizes of the semitone, however, the difference between the tritone and the semidiapente is a matter of significance. Ramos elects to avoid an in-depth discussion of the difference between the augmented fourth and the diminished fifth because, from a practical point of view, the matter is irrelevant.

With respect to the use of the tritone in a melodic line, Ramos provides specific examples that demonstrate his preference for an outward resolution from the augmented fourth to the perfect fifth, and an inward resolution from the diminished fifth to the perfect fourth:

...it is gentle and expressive if it is advanced through intermediate notes in ascent as well as in descent, for example: f e d c b and in reverse b c d e f. Still, the song should not stop on f when it ascends, but [it should] be turned around toward e. Likewise also, in descent it should be turned around toward c.8

Such explanations of the tritone prepare the way for Ramos's admission of a contrapuntal progression from the diminished to the perfect fifth or vice-versa:

For as Tristan de Silva says, "It is not prohibited in such a manner on the fifth, since a fifth after a fifth can be made as long as one is a semidiapente and the

8Ibid.
other is a diapente, as we find in the song *Sois emprantis* and in other more ancient [songs]."9 Ramos qualifies this admission by stating that successive fifths of uneven qualities should only be allowed when writing in "diminished note values."10 Although it is not explicitly stated here, it is clear from Ramos's later discussion of rhythm that what is meant by writing in "diminished note values" is writing "in minims."

Gaffurius strongly opposes the use of consecutive fifths, even if one of them is a diminished fifth, because he believes that the semidiapente has no place whatsoever in practical composition. Nevertheless, even Gaffurius must acknowledge that the semidiapente is indeed found in series of successive fifths in the compositions of his time:11

9Ibid., 51.

10Ibid.

11Other theorists confirm that Ramos's use of the diminished fifth was a prevalent part of common practice; in the *Lucidario in musica*, Pietro Aaron discusses the use of the diminished fifth on the minim and the semiminim, and like Ramos, Aaron cites Tristan de Silva's composition *Sois emprantis* as an illustration:

"... che non fa la terza, ne la sesta, secondo il qual modo dice Bartolomeo Rami, che Tristano de Silva diceva, che egli si puo dar una quinta dopo un'altra quinta, cioè l'una perfetta, et l'altra imperfetta, come si [q]uede in quello antico canto chiamato Soys emprantis, et in uno di Verdelot, Infirmatatem nostram etc pero che tal Quinta imperfetta non si concede nelle note intere, ma nelle parti minute del tempo, come [q]ui, cioè di Minima, et di Semiminima."

Aaron additionally provides a musical example that is taken from Verdelot's *Infirmatatem nostram*. See Aaron,
The second rule constitutes that two perfect consonances of the same kind cannot follow immediately after one another when ascending or descending together in song—such as two unisons, or two octaves, or two fifteenths or, if you prefer, even two fifths or twelfths which, even though they are not perfect, are counted [among] the perfect [intervals] on account of the agreeableness that is assigned [to them in] preserving their rules and mandates. For this rule is not arbitrary but legal, completely rejecting every exception. Nevertheless, some have believed that two fifths can be sung [while] ascending or descending together, provided that they are altered by diverse quantities and intervals—that is, one [is] perfect and the other [is] diminished by the subtraction or the lack of a semitone (e.g., proceeding from A re to E la mi or, if you prefer, from proslambanomenos to hypatē mesōn, [and] after that subsequently and immediately ascending from ἴ mi grave to F fa ut or, if you prefer, from hypatē hypatōn to parhypatē mesōn). In my opinion, this is erroneous; for no one doubts that the fifth [which is] diminished by a semitone is unsuitable in song, because in this manner the diminution is exaggerated and may [easily] be observed [by the listener].

Lucidario in musica, fol. AA7v. See also Berger’s discussion in Musica Ficta: Theories of Accidental Inflections, 103.

12"Secunda regula est quod duae perfectae species eiusdem generis non possunt consequenter et immediate simul ascendendo vel descendendo in cantilena constitui; puta duo unisoni, vel duae octavae, aut duae quintae decimae, sive etiam duae quintae aut duodecimae, quae et si perfectae non sunt, perfectis tamen (ob quam sortiuntur suavitatem) connumerantur, ipsarum regulas atque mandata servantes. Haec enim regula non arbitraria est, sed legalis, omnem penitus exceptionem reiciens. Nonnulli tamen sunt arbitrati duas quintas simul ascendentes vel descendentes pronuntiari posses, modo diversis protensa aut quantitatibus et intervalis, una scilicet perfecta, altera subtractione vel defectu semitonii diminuta; puta procedendo ab A re ad E la mi, sive a proslambanomenos ad hypatemonmeson, inde subsequenter et immediate ascendendo a ἴ mi gravi ad F fa ut, sive ab hypatōhypatōn ad parhypatemonmeson, quod mea sententia falsum est. Namque quintam semitonio diminuat quod maxima et nota sit huiusmodi diminutio, cantilenae incongruam esse nemo dubitat." Gaffurius, Practica musicae, ff. ddlt-r-v.
Successive Counterpoint and Fugue

An excellent model of fifteenth-century compositional practice is the *Musices opusculum* (1487) of Nicolaus Burtius. This particular treatise is celebrated as the first music theory treatise to contain a complete polyphonic composition in print. This famous woodcut is preceded with an informative discussion on the techniques of successive composition. Here, Burtius instructs the student on the manner in which the composer should construct the voices of a three-part composition, declaring that the soprano should be composed first, then the tenor, and finally the contrabass—which must be in agreement with the other two voices. Another discussion follows concerning the successive order of voices in mensural compositions containing a cantus firmus in the tenor. In this instance, Burtius declares the order of composition as tenor, soprano, and then contrabass.

Although Ramos does not discuss the compositional order of the voices, Burtius's discussion of counterpoint and imitation in the *Musices opusculum* clearly reveals the influence that Ramos had upon Burtius in regard to these issues. It is clear from the *Honesta defensio* of Spataro that Burtius had studied composition with Ramos. Spataro reminds Burtius of an occasion when the latter presented some of his contrapuntal compositions to Ramos; after examining them, Ramos advised Burtius to refrain from
performing his compositions until he had learned more about counterpoint.\textsuperscript{13}

Despite Burtius's denials to the contrary, a careful examination of the \textit{Musices opusculum} reveals that Burtius derived many of his theoretical concepts from his former teacher. Ramos's influence upon Burtius is especially evident in a comparison of their respective rules of counterpoint. Such a resemblance may, at first, appear to be insignificant, since these rules were quite common among the music theorists of the period. Burtius's fifth rule concerning contrary motion, however, contains an addendum explaining the procedure of imitation or \textit{fuga} that is clearly extracted from the \textit{Musica practica} of Ramos. Ramos's description of \textit{fuga} in the \textit{Musica practica} is the \textit{first} known definition of the technique in a music theory treatise. Burtius's explanation of \textit{fuga}—wherein the soprano imitates the tenor in its ascent and descent—contains word-for-word extractions from the Latin text of the \textit{Musica practica}, but Burtius makes no reference to Ramos as the source for his definition of this device:

\begin{quote}
Ramos: Nevertheless, there is an excellent way of making organum: when the organum imitates the tenor in ascent or descent it begins on the same note—not at the same time but after one or more notes—to make the same song or a similar [song] at the diatessaron or the diapente, or even at the diapason or its compound and decompound [octaves] above or below. Practicing
\end{quote}

\textsuperscript{13}See Spataro, \textit{Honesta defensio}, ff. 2v-3r or Chapter I of this commentary.
musicians call this method *fugue*, because one note follows another with a similar arsis or thesis . . . .¹⁴

**Burtius:** For the most excellent way of making organum or discanting is when the organum or the soprano (to use the common term) imitates the tenor in ascent or descent. It begins on the same note—not at the same moment but after one or two or more notes—to make the same melody on the same note. This is mostly observed in mensural song [where] it is called *fugue* by some practicing musicians.¹⁵

Whether or not Burtius directly extracted his definition of fugue from the published text of Ramos's *Musica practica* cannot be absolutely verified, but if this was not a conscious extraction on his part, then we can only postulate that Burtius unconsciously transmitted the definition of fugue that was given to him during his composition lessons with Ramos.

In addition to providing the first definition of fugue, Ramos provides three musical examples to demonstrate this type of imitation at the fourth below, at the fifth

¹⁴"Est tamen modus organizandi optimus, quando organum imitatur tenorem in ascensu aut descensu; non in eodem tempore, sed post unam notulam vel plures incipit in eadem voce eundem cantum facere aut similem in diatessaron vel diapente aut etiam diapason vel in suis compositis ac decompositis sub aut supra. Quem modum practici fugam appellant, propterea quod una vox aliam sequitur simili arsi aut thesi . . . ." Ramos de Pareia, *Musica practica*, 53.

¹⁵"Optime enim organizatur sive discantatur, quando organum sive supranus ut vulgi utar vocabulo imitatur tenorem in ascensu aut descensu non eodem momento, sed post unam aut duas notulas vel plures incipiet in eadem voce eandem melodiam organizando; quod maxie cantu mensurato observandum est, et a nonullis practicis fuga nuncupatur." Burtius, *Musices opusculum*, ff. e5v-e6r.
above, and at the octave above. Although he does not give specific musical examples for replication at various octaves, Ramos indicates that these examples may also be performed at the octave above or below, as well as at the unison. Figures 13, 14, and 15 illustrate Ramos's verbal explanations of fugue in modern notation.

Figure 13. Imitation at the Fourth Below

Figure 14. Imitation at the Fifth Above

Figure 15. Imitation at the Octave Above
Conclusion

Ramos's discussion of counterpoint in the *Musica practica* reveals the typical attitudes of the fifteenth-century musician toward aspects of consonance and dissonance. It is evident that Ramos possessed an exhaustive speculative knowledge of contrapuntal practices both past and present, as well as a thorough understanding of how these rules applied to the art of practical composition. Ramos's transmission of the standard contrapuntal rules of the fifteenth century demonstrate a conservative side of his character, and yet, his enthusiastic endorsement of the tritone in contrapuntal composition reveals a willingness to depart from those conservative traditions. Many of Ramos's ideas regarding counterpoint were espoused by musicians in the sixteenth century; the introduction of these concepts at the end of the fifteenth century, however, reveals a bold and dauntless character, who refused to be intimidated by the conservative dispositions of his contemporaries.
The only extant composition by Bartolomeo Ramos de Pareia is a perpetual four-voice puzzle canon that serves as the frontispiece for Florence, Biblioteca Nazionale Centrale MS Banco Rari 229. The attribution to Ramos is based upon the motto Mundus et musica et totus concentus—Bartolomeus Rami printed at the center of the manuscript in a clockwise fashion. While it is true that only the motto itself may have emanated from Ramos, several arguments strongly support the notion that Ramos could have been the composer of this canon: (1) Ramos identifies himself as a practicing composer with references to three of his own compositions in the Musica practica; (2) Ramos exalts the puzzle canon as an ingenious compositional device to be used to demonstrate one's teaching and intelligence (and thus it would be logical that he would demonstrate his own teaching and intelligence by this means); (3) the canon adheres to the contrapuntal practices proposed by Ramos in the Musica practica; and (4) the motto subscribes to Ramos's basic musical philosophy and employs his idiosyncratic terminology. Because there are no other extant compositions
attributed to Ramos, a stylistic comparison is, of course, impossible.

This single surviving composition, attributed to Bartolomeo Ramos de Pareia, has received considerable attention by twentieth-century musicologists. Albert Seay, in Florence: The City of Hothby and Ramos, proposes that the inclusion of Ramos's canon in the Florentine codex 229 is a confirmation of Ramos's status as an acclaimed musician in Florentine musical circles before his residence in Bologna. Although the appearance of this composition in a Florentine manuscript provides circumstantial evidence for Seay's premise, the fact that Ramos fails to mention this composition in the Musica practica among the citations of his other puzzle canons suggests that this work was written by Ramos after the publication of the Musica practica in 1482. A unique and very illusive puzzle in its own right, it is highly unlikely that Ramos would have failed to mention this work if it had already been composed by the time that the Musica practica was published in 1482.¹

In the introduction to A Florentine Chansonnier From the Time of Lorenzo the Magnificent: Florence, Biblioteca Nazionale Centrale MS Banco Rari 229,² Howard Mayer Brown

¹See Chapter II of this commentary for a more thorough discussion of Ramos's residence in Florence.

²See Howard Mayer Brown, ed., A Florentine Chansonnier From the Time of Lorenzo the Magnificent: Florence, Biblioteca Nazionale Centrale MS Banco Rari 229, vol. VII,
examines the manuscript itself and discusses the multiple transcriptional possibilities that are suggested by Ramos's canonic inscription. Although the investigative research of Seay and Brown is quite thorough and still available for study, a discussion of Ramos's ideas on counterpoint would be lacking without an examination of one of his own contrapuntal compositions. An examination of the only extant composition by Ramos provides insight into the application of the contrapuntal rules that are contained in the *Musica practica*, and sheds light upon the reasons why Ramos was so attracted to the puzzle canon.

Based upon its musical content, text script, illuminations, and binding, it is believed that the undated manuscript Florence 229 is a product of the late fifteenth century. The canon inscribed on the frontispiece is one of three, full-page illuminations that appear on the initial folios of the manuscript. The intricate illuminations—masterpieces in their own right—have been attributed to the famous Italian artists, Gherardo and Monte di Giovanni—two brothers known to have operated a workshop in Florence during the second half of the fifteenth century. The manuscript itself measures 24 by 17 centimeters with the music inscribed in white mensural notation by a single, scribal hand. In addition to the canon by Ramos, the

manuscript contains musical compositions by Johannes Martini, Heinrich Issac, Antoine Busnois, and Alexander Agricola.³

The illumination of Ramos's canon on folio IIIv demonstrates the technique of grisaille—a style of monochromatic painting in shades of grey that was often employed by the Giovanni brothers. The musical notation is depicted in gold on a circular staff against a bright blue background. There are four figures, also depicted in gold, which represent the four winds—Oriens (east), Meridion (south), Occidens (west), and Septentrion (north). By blowing at a specific note within the canon, the four winds identify the four canonic entrances; the East Wind at the top of the page, blowing his note through a conch shell, indicates where the canon is to begin. Within the circle, in gold lettering, appears the motto Mundus et musica et totus concentus—Bartolomeus Rami and the canonic inscription Sive lidium in sinemenon sive ypolidium diazeugmenon per quatuor quartas ducas renovando dulcem harmoniam intra diapason senties melodiam bene modulando.

Howard Mayer Brown notes that the motto Mundus et musica et totus concentus ("The world and music and complete harmony") is wholly consistent with Ramos's attempt to associate the art of music with the harmony of the world and

³Brown, A Florentine Chansonnier, 5-11.
proposes that the character of this motto and its link with the music itself gives us little reason to doubt that Ramos was the composer of both the motto and the music. Ramos not only addressed the concept of musica mundana in his Musica practica, but he also introduced the special term "totus concentus" as an idiosyncratic part of his terminology. The music of Ramos's canon achieves the quality of the totus concentus in that the canon requires all eight solmization syllables through the appearance of all eight pitches of the modal scale, and in that the total range of the composition (in its simplest transcription) does not exceed the octave.

At the bottom of the illumination, between two cherubs with green wings, a bright red panel holds the third satire of Horace in gold lettering: Omnibus hoc vitium est

---

4Chapter VII of this commentary has demonstrated how Ramos tried to establish a relationship between musica instrumentalis and musica mundana with his discussion of the correspondence between the musical modes and the planets, the Muses, and Greek string names.

5In Part 1, Treatise 1, Chapter 1, Ramos provides a diagram that includes the term totus concentus above each octave (see Figura 2). Later on in Chapter 7, Ramos states that the totus concentus is created from the eight syllables of his solmization system: "... et sic erit conclusio syllabarum: psallitur per voces istas, quoniam octo vocibus fit totus concentus." Translation: "Thus, the conclusion of the syllables will be: psallitur per voices istas, since the entire concentus is created from [these] eight voices." Both of these citations demonstrate the correlation of the term totus concentus with the "complete harmony" of the octave and the eight pitches that are contained therein.

6Brown, The Florentine Chansonnier, 17.
cantoribus inter amicos ut numquam inducant animum cantare rogati, iniussi numquam desistant.⁷ A translation of this satire illustrates the tongue-in-cheek humor that is reminiscent of Ramos's literary style:

The trouble with all singers is this: when they are asked to sing among their friends, they can never be persuaded; but when they are unbidden, they never stop.

The purpose of this quotation is, of course, to alert the performer to the perpetual form of this canon. Because the perpetual canon may continue on forever, Ramos provides this cryptic warning to the performers, cautioning them to select a predetermined point of conclusion. Figure 16 displays a monochromatic copy of this intricate masterpiece.

Possible Solutions to the Canon

The most difficult problem presented by this composition is determining the solution to the canonic inscription within the circle:

Whether you proceed with either the Lydian into the synēmmenōn or the Hypolydian into the diezeugmenōn, you will hear a properly measured melody by means of four quarters [and] by renewing the sweet harmony within the limits of the diapason.

Due to the enigmatic character of this inscription, scholars have proposed more than one solution to this puzzle. The most obvious solutions to this canon are (1) a rendering in the Lydian mode, beginning on the pitch F with the employment of B♭'s to represent the synēmmenōn

⁷Ibid., 16-17.
Figure 16. Frontispiece to Florence, Biblioteca Nazionale Centrale MS Banco Rari 229, fol. IIIv. Source: Howard Mayer Brown, ed., *The Florentine Chansonnier*, plate II.
tetrachord, or (2) a rendering in the Hypolydian mode, beginning on the pitch C with the employment of B♭'s to represent the diezeugmenon tetrachord (see Figures 17 and 18). Ramos's canonic inscription provides the singer with the option of choosing between the authentic-plagal counterparts of the Lydian mode, but the dualistic nature of the inscription results more in a transpositional advantage in matters of tessitura rather than a clear modal shift from authentic to plagal.8

Figure 17. Perpetual canon, 1st version; Lydian mode. Source: Howard Mayer Brown, ed., The Florentine Chansonnier, 18.

---

8 Ibid., 18.
Brown derives more radical solutions by means of slightly different interpretations of the canonic inscription. The first alternative of these requires that the phrase "proceed with the Lydian into synēmmenōn" be interpreted as "begin in the Lydian mode and lead the first segment of the melody into (and through) the synēmmenōn"; it also requires that the Latin term quatuor quartas be interpreted as "four fourths" rather than "four quarters." Consequently, Brown requires the first note of the fifth measure to be transposed by a fourth in order to allow the initial entrance to actually proceed "into" and "through" the synēmmenōn tetrachord of A B♭ C D. Meanwhile, the second voice enters a fourth above the initial statement.
with its own statement on B♭. If this transposition is
carried out in the statements of the remaining two canonic
entrances, the canon will have undergone a transposition of
four perfect fourths by the time the first voice returns to
the first phrase of the canon (see Figure 19).

One could argue that such a transcription would
contradict the meaning of the phrase "renovando dulcem
harmoniam intra diapason"; Brown, however, notes that the
phrase "by renewing the sweet harmony within the limits of
the diapason" can be interpreted so that the transpositions
of a fourth are perceived as a renewing of the melody that
had previously been presented within one octave.⁹

Theoretically, the perpetual nature of the canon
allows it to continue indefinitely or at least to proceed
through twelve complete statements of the melody by means of
the circle of fifths (whereupon there would be a return to
the starting pitch).¹⁰ The drawback to Brown's proposed
solution is the extraordinary range that results when the
canon is performed in this manner, far exceeding the gamut
that was recommended by Ramos in the Musica practica.
Although the range is excessive, Brown's solution cannot be
considered as inconceivable; Ramos himself declares that,
Figure 19. Perpetual canon, 3rd version; beginning in the Lydian mode. Source: Howard Mayer Brown, ed., The Florentine Chansonnier, 20.
Figure 19. --continued--
theoretically, hexachords could be multiplied ad infinitum.\textsuperscript{11} Moreover, as Brown aptly notes, a performance of the canon—using this solution—could reach a successful conclusion where the first voice completes the transposition through four fourths (measure 17).\textsuperscript{12}

Brown suggests that this Lydian solution, with multiple transpositions, could also be performed in the Hypolydian mode by beginning on the pitch C and continuing through the circle of fifths. Brown fails to mention, however, that such a solution requires "through the \textit{diezeugmenōn}," to be interpreted more freely to signify merely the implementation of the pitch B\textsuperscript{♯}, rather than the former connotation of singing "into" and "through" the tetrachord. A transference of this chromatic solution to the Hypolydian mode could not possibly hold the same interpretation with regard to the implementation of the tetrachord that it did in the Lydian mode. In the Lydian-chromatic solution, Brown interprets the phrase "through the \textit{synēmmenōn}" to represent the point at which the transposition is to take place, and the transposition is achieved through the actual "working out" of the \textit{synēmmenōn} tetrachord; in the Hypolydian-chromatic solution, no such stepwise "working out" of the \textit{diezeugmenōn} tetrachord

\footnotesize
\textsuperscript{11}Ramos de Pareia, Musica practica, 10.  
\textsuperscript{12}Brown, A Florentine Chansonnier, 19.
occurs. This is not to suggest, however, that Brown's Hypolydian-chromatic solution should be discarded; it calls attention only to the fact that one must be willing to accept a much freer interpretation of the Latin inscription.

Brown offers a fourth solution to the canonic puzzle, by far the most unlikely. Due to the fact that the Hypolydian version of this canon does not contain a step-wise statement of the diezeugmenon tetrachord (B♭ C D E), Brown must resort to an interpretation of the term diezeugmenon in the basic Greek sense of "disjunction."

Similar to the Lydian solution in Figure 19, Brown's fourth solution proposes transpositions at a perfect fourth, but with chromatic shifts that occur at a much slower pace (see Figure 20). In the Hypolydian solution, Brown places the first transposition in measure 16 of the initial melody—where three of the four notes of the diezeugmenon tetrachord appear (i.e., the notes C D E). In the Lydian-chromatic version, Brown proposes that the transpositions be made conjunctly at the point of elision where the last note of the conjunct tetrachord (the synëmmenon) becomes the first note of the new section. Conversely, in the Hypolydian-chromatic version, Brown proposes that the transpositions be made disjunctly, with the transposition of the new section beginning a step higher than the highest pitch of the diezeugmenon tetrachord.
Figure 20. Perpetual canon, 4th version; beginning in the Hypolydian mode. Source: Howard Mayer Brown, ed., The Florentine Chansonnier, 21.
Brown appears to favor his last solution, suggesting that this fourth version is less abrupt due to the slower pace of the chromatic transpositions. He also submits this version as an example of "sweeter and smoother" harmony. In reality, however, Ramos's comparison of the Lydian and Hypolydian modes demonstrates that the preferred mode for "sweeter, smoother" harmony is the Lydian mode; for Ramos clearly states that "the lower sound [the Hypolydian mode] is not as sweet nor as gentle as the higher sound [the Lydian mode]." ¹³

**Conclusion**

Perhaps the strongest argument for the resolution of *Sive lidium in synēmmenōn* can be made in favor of the third solution, albeit a highly chromatic solution. First, the phrase *sentio melodiām bene modulando* that appears in the inscription may be interpreted as "you will hear a well-modulated melody"; and thus, the third solution with its multiple transpositions could easily be perceived as a manifestation of "well-modulated melody." Second, the occurrence of such chromaticism is not unusual; composers of the time were experimenting with the full gamut of chromatic possibilities, and Ramos himself promotes the use of the chromatic and enharmonic genera in the *Musica practica*. Truly, as Brown notes, if the third version is the "proper"

---

solution to Ramos's canonic inscription, then Ramos is far ahead of his successors;¹⁴ for Josquin's chromatic chanson, Fortuna d’un gran tempo, does not appear until 1501¹⁵ while Adrian Willaert's Quid non ebrietas does not appear until some twenty years after Josquin's masterpiece.¹⁶ Such experimentation with chromaticism would not have been feasible within the tradition of Pythagorean tuning, but with the increasing acceptance of other types of tuning, composers were able to employ the possibilities of chromaticism to greater degrees. As an innovator in matters of tuning and solmization, it is not unreasonable to presume that Ramos stood at the forefront of the chromatic tradition which dominated musical practice in the sixteenth century.

Ramos was severely criticized by Hothby for his delight in the obscurities of the puzzle canon. Hothby claims that the puzzle canon's enigmatic directions hide the true intention of the composer and ultimately confuse the performer. Hothby contends that the canonic subscriptions should help, rather than hinder, the musician, and if the theorist truly desires to fulfill his destiny as a teacher,

¹⁴See Brown, The Florentine Chansonnier, 22.


he should promote practices that reveal, rather than conceal, the composer's wishes.\textsuperscript{17}

For once, Hothby may have a valid argument, since even today, we are perplexed by what Ramos intended as the one true solution to this enigmatic inscription. As the only extant composition from which we can deduce Ramos's own ability as a composer, we are left with a canon so expertly devised that any one of at least four solutions are permitted by his enigmatic inscription without the need to break even a single contrapuntal rule of the \textit{Musica practica}; even in regard to occurrences of augmented fourths and diminished fifths the canon has been composed with such skill that the former resolve outwardly and the latter inwardly.

In the final analysis, it is impossible to determine Ramos's intended solution for this canon; if, indeed, a single solution was even intended. From our understanding of Ramos's personality, it is likely that the composer would have taken great delight in the frustrations of twentieth-century musicologists.

\footnote{See Seay, "The Dialogus Johannis Ottobi Anglici in arte musica," Section VI, 98-99.}
PART II

THE TRANSCRIPTION AND TRANSLATION
NOTES ON THE EDITIONS, TRANSCRIPTIONS, AND TRANSLATIONS OF THE MUSICA PRACTICA

The Editions

Although the original, handwritten manuscript of the Musica practica appears to have been lost, three printings of the Musica practica remain extant. Two printings, labeled A-80 and A-81, are currently held by the Civico Museo Biblioteca del Conservatorio Liceo Musicale (Bologna); these printings were, for many years, believed to be the only extant printings of the Musica practica. In 1935 Federico Ghisi discovered a third printing in Florence at the Biblioteca Nazionale Centrale, now identified as A-7-35.¹ Microfilms of all three printings were consulted in the preparation of this translation.

Each printing consists of 42 folios (84 pages), containing between 36 to 38 lines on each leaf.² The folios themselves are arranged in eight layers within two


²It was customary for treatises of this period to use folio numbers with the designations of recto and verso for the front and back of the folio, respectively. The Musica practica has not been thoroughly numerated with folio numbers; only a few signatures of a2, b3, etc. appear at scattered locations. Therefore, this dissertation's numeration of the Musica practica employs page numbers rather than folio numbers.
quarto volumes measuring 23.6 x 16.8 centimeters. The frontispiece of all three editions is missing, but each edition includes the title, the location of publication, and the publication dates in the summary at the end of the epilogue.  

The first printing, A-80, is dated 11 May 1482 and is thought to be the work of the typographer Enrico de Colonia. This copy originally belonged to Ramos's student, Giovanni Spataro, and is of special interest due to the abundance of annotations. In a letter to Pietro Aaron dated 27 November 1531, Spataro indicates that he sent this particular copy of the Musica practica to Franchinus Gaffurius in Milan. Gaffurius returned the copy with numerous annotations; these annotations not only provided the provocation for Spataro's reply to Gaffurius—the Utile e breve regule di canto—but provide invaluable insight concerning the reception of Ramos's theoretical concepts by his contemporaries. In addition to Spataro, Ercolo Bottrigari and Padre Giovanni Battista Martini are also believed to

\[\text{3} \text{Ghisi points to this lack of a frontispiece as further evidence for his hypothesis that the Musica practica was published hastily; Wolf, however, indicates that the lack of a frontispiece was typical in the printed editions of this time period. See Ghisi, "Un terzo esemplare della Musica practica," 225-26 and Wolf, ed., Musica practica, viii.}\]

\[\text{4} \text{See Chapter II of this commentary for a discussion of Gaffurius's marginal comments. Gaffurius's annotations, with English translation, appear in the endnotes of this dissertation.}\]

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
have possessed the A-80 edition and it is possible that some of the annotations (in a different hand) may have been added by the latter two Italian writers.

One complication in the preparation of this translation is the quality of typography in the A-80 edition. In his Trimerone, Bottrigari refers to the Musica practica as one of the poorest prints he has ever seen:

The first treatise, the third part, of the Isagogue of Bartolomeo Ramos's Musica practica is so badly printed [that it is] like no other book I have ever seen. Truly, if up to now I had only seen those books that belong to the collection that was gathered by S.C.H.B and covers all the sciences except medicine and law, I still would have seen so many thousands [of books] that I can [feel confident to] express this true evaluation in this manner.5

The Italian musicologist Albano Sorbelli relates that Ramos endured numerous problems in retaining a typographer for the A-80 edition. The original printer of the Musica practica, Baldassare Rubiera, soon became discouraged by Ramos's lack of funds and his plummeting reputation in Bologna. Rubiera fled the city with his printing tools, leaving the project without a typographer. Enrico di Colonia eventually assumed

---

the position of typographer but refrained from accepting credit. Given Rubiera's earlier efforts, perhaps di Colonia thought it unethical to place his name as the sole typographer; it is equally plausible that di Colonia may have been embarrassed by the poor type-setting and did not want his name associated with such an inferior printing.

The second printing of the *Musica practica* was completed by means of "the labor, diligence, and expense of Maestro Baltasar de Hiriberia." This copy, A-81, is dated 5 June 1482. Essentially, the A-81 edition is a reprint of A-80 with the absence of folio 22 and some minor modifications.

Both A-80 and A-81 were printed with blank spaces for elaborate colored initials and miniatures. The initials were subsequently inserted in bright red and blue ink, with the exception of the initial "H" on the word Harmoniam at the beginning of the first chapter; this initial is elaborately outlined with foliage and arabesques in green, white, black, and gold. The graphics of notes, clefs, and

---

6The last folio of A-80 contains typographical fonts that are much larger in size than those of the rest of the treatise. It is possible that Rubiera had completed the entire treatise except for this last folio by the time di Colonia assumed the position as typographer or, as Wolf suggests, the change in type-face could have been due to some problems with the press itself. See Albano Sorbelli, "Le due edizioni della *Musica Practica* di Bartolomeo Ramis de Pareia," *Gutenberg Jahrbuch* V (1930): 112-13 and Wolf, ed., *Musica practica*, viii.

7Ramos de Pareia, *Musica practica*, 82.
time signatures were also to be added by hand. A-80 contains these graphics but blank spaces remain in A-81.\(^8\)

The edition held in Florence at the Biblioteca Nazionale Centrale, labelled A-7-35, is essentially a reprint of the A-81 edition and contains most of the features of the second Bologna manuscript. That A-80 was consulted in the preparation of this third edition can be confirmed by the fact that it contains folio 22 (which is missing from the A-81 edition), and by the fact that the last page of A-7-35 is a reprint of the final page of A-80.\(^9\) The only distinguishing feature of the A-7-35 edition is the cover sheet, upon which is printed the words *Hic liber est Abbattie florentine* 67.\(^{10}\)

The numeration of the folios in the three editions are sparse and sporadic to say the least. Folios a2, a3, b2, b3, c, c2 are clearly marked in both editions, but the numerations for folios a, a4, a5, b, b4, b5, c3, c4, and c5 are missing and there are no more numerations of the folios after c5.

\(^8\)Wolf, ed., *Musica practica*, ix.

\(^9\)Ghisi believes that the discovery of A-7-35 confirms Gaspari's hypothesis that the edition dated 5 June is actually the original edition of the *Musica practica*. This assertion is largely based upon the similarity of the typographical characters in A-81 and A-7-35. Gaspari proposes that A-80 was given the date of 11 May by mistake, and that this edition is actually the second printing rather than the first. See Ghisi, "Un terzo esemplare della *Musica practica*, 224.

\(^{10}\)Terni, *Música Práctica*, 55.
The most significant difference between the three editions is found in the last chapter (before the epilogue) after the words repperisse testabatur, where A-81 has almost an entire paragraph that does not appear in A-80 or A-7-35:

Credimus enim error illi sic emerserit, ut gama, vox quae addita fuit a nostris, fore crediderit proslambanomenon. Neque igitur hoc neque illud in diatonico genere nostro admittendum esse arbitramur. Nam tunc in illum incideremus errorem, in quem Timotheum Milesium teste Boetio incidisse legimus genus scilicet diatonicum in chromaticum, quod melius est, convertentem, propie quod illum Lacedaemonii de Laconica exegere civitate, quoniam puere animos, quos accoperat erudiendos, officiebat et a virtutis modestia ad mollitiam declinantes effeminatos efficiebat. Non igitur tantum utilitatem illa tertia media nobis adducit, quantum discrepantium atque discordiam in toto ordine provenit, cum neque secundum naturalem neque secundum aliquem accidentalem ordinem illo modo, ut isti dicunt, collocetur. Sed de his hactenus.11

In Part 3, Treatise 2, Chapter 4, a sentence appears in the A-7-35 and A-80 editions that does not appear at all in the A-81 edition. This sentence is inserted after the words repperisse testabatur and reads as follows: "Melius tamen primi sensorunt, cuius veritatem in sequenti volumine firmissimis numerorum rationibus enucleabimus."12 The final sentence of Chapter 4 is the same in all three editions: "Nunc autem epilogando supradicta huic operi finem imponamus."13

---

11Ramos de Pareia, Musica practica, 82.
12Ibid.
13Ibid.
Another difference between the three editions appears on page 18, Part 1, Treatise 1, beginning with the words *Si autem de numero arguatur quia non tanti valoris*. In A-80 these words are the beginning of a new chapter--Chapter 8, but in the A-81 and A-7-35 editions this phrase appears directly after a large blank space, without any indication that a new chapter begins at this point. Thus in Part 1, Treatise 1, these two editions are lacking the intended chapter heading for Chapter 8, and all the text which continues on through the next folio appears to be a part of Chapter 7.

The explicit at the end of A-80 and A-7-35 is different from that of the A-81 edition; it reads as follows:

Explicit musica practica Bartolomei Rami de Pareia Hispani ex Betica provincia et civitate Baecza Gienna dioecesi vel suffragana oriundi, almae urbis Bononiae, dum eam ibidem publice legeret, impressa anno Domini millesimo quadringentesimo octogesimo secundo quarto idus Maii.14

The explicit of the A-81 edition not only has a different publication date, but contains entirely different text from the other two editions; it reads as follows:

Explicit feliciter prima pars musicae egregii et famosi musici Bartholomei Parea Hispani, cum publice musicam Bononiae legeret, in qua tota practica cantorum pertractatur, impressa vero opere et industria ac

---

14Ramos de Pareia, *Musica practica*, 82.
expenses magistri Baltasaris de Hiriberia anno domini 1482 die 5\textsuperscript{a} Junii.\textsuperscript{15}

Editorial problems are rampant in the three editions of the Musica practica. Ghisi proposes that these problems were a result of Ramos's failure to obtain the public lectureship at the University of Bologna. This failure, undoubtedly, affected Ramos's credibility, and would have had a direct impact upon his ability to secure funding for the publication of the Musica practica. Spataro relates that Ramos left Bologna rather hastily, taking the manuscript with him in the hope of having it printed in Rome.\textsuperscript{16} Wolf notes that some of the editorial problems—including the changes in type-face—may have been due to problems with the press itself, since some of the pages have been totally reset.\textsuperscript{17} Another explanation for the lack of corrections and editing in the printed editions may have been that Ramos originally intended to publish three volumes—the Musica practica, Musica theorica, and Musica semimathematica. The extant copies of the Musica practica may have merely been perceived as proof copies; the editor may have been waiting for the completion and

\textsuperscript{15}Ibid.

\textsuperscript{16}Ghisi, "Un terzo esemplare della Musica Practica," 224-25.

\textsuperscript{17}Wolf, ed., Musica practica, viii.
setting of the second and third volumes before making corrections to the final copy.

The Transcriptions and Translations

A reprint in modern type of the Baltasar printing—complete with Gaffurius's annotations that appear in A-80—was released in 1901 by the Internationalen Musik-Gesellschaft, Beihefte II (ed. by Johannes Wolf); the work was reissued in 1968 by Breitkopf and Härtel. Contrary to the statement by Gustave Reese in Music in the Renaissance (1954), this edition is not a German translation; the Wolf edition is merely a reprint of the original Latin to which a German-language introduction and critical footnotes have been added. A second reissue of the Baltasar edition was released in 1969 by Forni Editore Bologna. This edition includes a brief preface in Italian by Giuseppe Vecchi, but there are no annotations of any kind.

The Musica practica exists only in the original Latin and in two twentieth-century Spanish translations. The first of these translations, published in 1977, is a Latin-Spanish translation of the Baltasar de Hiriberia printing; the second, published in 1983, expands upon

---

the first translation by way of appendices that include a biography of Ramos, a reprint of Spataro's defense of Ramos (*Honesta defensio in Nicolas Burtii parmensis opusculum* taken from the Vecchi edition), an errata, and a glossary of fifteenth-century terminology.

**The Procedures for the Translation**

An understanding of the *Musica practica* is requisite for a comprehension of the musical climate of the fifteenth century. Because of the inherent problems related to its translation (i.e., the illegibility of the treatise itself and the difficulty imposed by the author's unusual usage of the Latin language), the *Musica practica* of Bartolomeo Ramos de Pareia has remained largely unavailable to Western scholars.¹⁹

Indeed, the foremost obstacle in the translation of the *Musica practica* was the illegibility of the

---

¹⁹In *Source Readings in Music History*, Strunk provides translations of the two most important chapters that pertain to Ramos's division of the monochord— that is, Part 1, Treatise 1, Chapter 2 and Part 3, Treatise 2, Chapter 3. Lindley, in "Fifteenth-Century Evidence for Meantone Temperament," translates selected portions from Part 3, Treatise 2, Chapter 4 of the *Musica practica*. Lindley's translation should be avoided, however, because the selected sections appear out-of-context and portions of text have been omitted without explanation. It appears that Lindley's omissions are an intentional attempt to build a case for his hypothesis that Ramos's tuning was actually a form of meantone temperament (see Chapter IV of this commentary).
An indispensable tool for the completion of the English translation was the Marstek 800 DPI Hand Scanner, which was employed for computer-enhanced examinations of contrast in the more illegible passages. This computer enhancement was especially useful for deciphering Gaffurius's marginal annotations in A-80. Gaffurius's Latin annotations appear in the footnotes of Wolf's edition, but this dissertation is the first document to contain a translation of these comments into English. These annotations provide the reader with a broader understanding of the great divergency inherent in the theoretical concepts espoused by Gaffurius and Ramos.

Due to the illegibility of the original treatises, the figures, symbols, and musical examples of the Musica practica have been reprinted here from the Wolf edition; again, these figures, symbols, and musical examples have been computer-enhanced to increase their legibility.

---

Riemann relates in a footnote to his comprehensive study, the History of Music Theory, that, despite all his efforts, he was not able to secure a legible copy of the Musica practica from the Liceo filarmonico of Bologna. Riemann claims that the Latin script of this treatise was so difficult to read that the librarian of Bologna, Luigi Torchi, could not find a copyist that was willing to make him a copy. In the meantime--while Riemann was completing his History of Music Theory--Wolf published his modern-print edition of the Latin script. See Riemann, History of Music Theory, 280, fn.
In addition to the problem of illegibility, Ramos's use of the Latin language presents a significant challenge to the translator. This is especially true of the Prologue, which is written in erudite, formal Latin with the obligatory interjections of Greek terminology and references to Greek mythological personae. Ramos's text includes many abbreviations and, at times, suggests the cursory style of a professor's lecture notes. It is possible that Ramos had written a large portion of the *Musica practica* while serving on the faculty at the University of Salamanca and may have delivered some of its contents in classes there; it is equally possible that he secretly reserved the manuscript with the intention of revealing its contents when he received the anticipated public lectureship from the University of Bologna.

Although he desired to present himself as a learned man to the musical community, Ramos commits numerous errors in grammar and syntax. These errors remain in the Latin transcription, although every attempt has been made in the English translation to convey the intent of Ramos's prose, and yet, retain his unique personal style as closely as possible. Explanatory remarks are provided in brackets—whenever necessary—to facilitate comprehension of the English text.
In the Ars musicorum, Ramos's contemporary Guillermo Despuig (fl. 1495) speaks against "other music theorists" who maim the Latin language with their inelegant Latin style, performing such blunders as assigning the words diatessaron, diapente, and diapason to the feminine gender. Stevenson notes that this error of gender is exactly the type of error that Ramos repeatedly commits in the Musica practica of 1482. Due to the proximity of the publication dates of the Musica practica and the Ars musicorum, it seems plausible that Despuig may have been directing these criticisms toward Ramos.21

To assist the reader in a comparison of the Latin and English text, this translation has been arranged in side-by-side columns with page numbers of the original treatise bracketed between the columns of text. I have elected to follow Wolf in correcting the orthographical inconsistencies and inaccuracies that are due to the carelessness of the printer, and have substituted the spellings of Medieval-Renaissance Latin with modern spellings.22 Brackets within the columns of the Latin

21 Stevenson, Spanish Music in the Age of Columbus, 74-75.

text indicate such spelling corrections, and a compilation of these corrections appears in Appendix E. In addition, I have employed the indention and capitalization rules of modern English grammar; punctuation of the Latin text, for the most part, adheres to Wolf's edition.

Because it is the most complete of the original editions, my translation is based upon the A-80 edition of the *Musica practica*. The A-81 and A-7-35 editions as well as the Latin-Spanish translations of José Luis Moralejo and Clemente Terni, and the Wolf edition of the *Musica practica*, were all consulted in the preparation of this translation with significant differences so noted.

Due to the illegibility of all three editions of the *Musica practica*, as well as their general availability in facsimile and on microfilm, a facsimile has not been appended to this dissertation.

---

23 The A-80 edition is the only edition complete with musical examples and symbols; it is also the only edition that contains the handwritten annotations attributed to Gaffurius, Bottrigari, and Martini.
THE MUSICA PRACTICA

OF

BARTOLOMEO RAMOS DE PAREIA
Boetii musices disciplina quinque voluminibus comprehensa quoniam profundissimis arithmethicae philosophicae fundamentis innititur nec passim ab omnibus intelligi potest, solet a semidoctis nostri temporis cantoribus quo obscurior est eo sterilior, doctis vero et altius intuentibus quo subtilior probabiliorque est eo firmior meliorque videri, quo fit, ut, sicut ab indoctis neglecta semper fuerit et sit, ita apud peritiores in magno pretio semper habita sit et habeatur.

Unde nos, qui omnibus prodesse et aliquid in communem utilitatem conferre studemus, hoc brevi compendio tribus libellis distincto proximitatem eius in angustum, asperitatem in planum, obscuritatem in lucem reducentes nihilque quod ad artem usumque faciat praetermittentes et cantoribus quos practicos et speculantibus quos theoreticos graece dicimus opus admodum utile construximus, ex quo, ubi

The musical instruction of Boethius—contained in five volumes—is based upon the most profound foundations of arithmetic and philosophy. Since it cannot be grasped by everyone far and wide, it usually seems that the more obscure it is, the more unprofitable it is to the poorly educated musicians of our time; however, to the educated [musicians] and to those with deeper insight, it seems that the more detailed and credible it is, the more useful and lasting it becomes. Thus, just as it is neglected and always has been by the untrained, so among the more experienced it is regarded and always has been with great esteem.

Wherefore, with this short compendium divided into three little books, we, who desire to [be of] benefit [to] everyone and to contribute something toward the common good, are reducing its generalities into specifics, its difficulty into clarity, and its darkness into light without overlooking anything that is necessary to art and practice. We have constructed a very useful work both for the
id legerint
intellexerintque, plurimum
et honoris et voluptatis
se consecuturos esse
perspicient fatebunturque
hac nostra nova
speciosissimae artis forma
mirifice delectati nos ad
communem omnium
eruditionem praesenti hoc
labore plurimum adiumenti
contulisse.

Hinc quasi ex quodam
redundanti publicoque
fonte quicquid ego longo
tempore multis vigiliis et
assiduis lucubrationibus
ex probatissimorum
auctorum lectione et
clarissimorum praeceptorum
disciplina colligere
potui, perquam celerrimo
facillimoque studio
licebit haurire et ad
summum musicae culmen
placidissimo gressu
pervenire.

Nemo philosophiae
maiestatem, nemo
arithmeticae
perplexitatem, nemo
proportionum formidet
anfractus. Hic enim
quilibet, etsi usquequaque
sit rudis, modo
disciplinae accommodare
velit auditum et rationis

singers—whom in Greek we
call praktikos—and for
the speculative musicians
—whom in Greek we call
theorikos. When they have
read and understood [our
three little books] they
will realize that they are
going to attain a great
amount of honor and
pleasure from this [work],
and they will acknowledge
—having been wonderfully
delighted by this our new
form of [that] most
beautiful art—that with
this present work we have
contributed a great deal
of aid toward the common
instruction of everyone.

After a long period of
many sleepless nights and
continual nocturnal
studies, I have been able
to collect [information]
from the readings of the
most esteemed authors and
from the instruction of
the most famous teachers.
From this [effort]—as if
from some overflowing and
general source—one will
be permitted with
extremely quick and easy
study to absorb all [these
things] and reach the
highest pinnacle of music
by the most tranquil
course.

Let no one fear the
majesty of philosophy, nor
the complexity of
arithmetic, nor the
digressions of
proportions. For here,
anyone is able to become a
most outstanding and
skillful musician—even if
he is unskilled in
omnino non sit expers, in praestantissimum peritissimumque musicum potest evadere. Usque adeo namque intelligentiae servire studuimus, ut in his legendis peritiores abunde recreari, semidoci plurimum proficere, omnino indocti blandissime queant erudiri. Non philosophos tantum aut mathematicos instituendos hic suspicimur, quilibet modo prima grammaticae rudimenta sit edoctus, nostra haec intelliget. Hic mus et elephas pariter natare, Daedalus et Icarus pariter volare possunt.

everything—provided that he is willing to devote attention to learning and is not completely destitute of reasoning. For indeed, inasmuch as we have desired to serve intelligence, we have retained the blending of expression and the control of style, so that in these readings the experts will be able to be amply refreshed, the poorly educated will be able to make great progress, and the altogether untrained may be able to be instructed with the greatest of pleasure. We undertake [this work] not so much for the purpose of preparing philosophers or mathematicians here; anyone instructed only with the first rudiments of grammar may understand this our [discourse]. Here, the mouse and the elephant alike can float side by side; Daedalus and Icarus can fly away together.²

Praeterea prudentis et grati lectoris officium erit veniam dare, si nostro hoc in opere non eum, qui apud Ciceronem et Salustium est, orationis fastum inveniet, si paucioribus phaleris minorique cultu sermo noster incedit. [Liceat] enim mihi de musica dicere, quod Marcum Manlius de astronomia dixisse legiunmus: "Ornari res ipsa negat, contenta doceri."

Moreover, it will be the duty of the experienced and attentive reader to grant forgiveness if he does not find in our work one who writes with the eloquence of Cicero³ and Sallust,⁴ and if our discourse proceeds with fewer ornamentations and less refinement. Now permit me to say about music what we have read that Marcus Manlius said about astronomy: "The truth itself refuses to be
Verum ad hanc egregiam philosophiae partem, musicam scilicet, si quis eius vim, naturam, pulcritudinem generositatemque consideret, non exhortationibus meis attractus sed ultero et sponte convolabit sequeturque Orphei Thracii, Amphionis Thbeani, Arionis Lesbi, Mercurii, Lini, Salomonis, Pythagorae, Aristoxeni, Ptolemaei, Chorebi, Lycaonis, Prophrasti, Timothei ceterorumque adoranda vestigia, qui hac disciplina freti immortale nomen adepti sunt.

Hi fuere, quos venerabilis antiquitas adeo mirata est, ut eos dixerit carnis dulcedine movisse feras, corda hominum possedisse, animas in corpora revocasse, manes ad misericordiam inflexisse et duras traxisse e montibus ornos. Quae licet fabulosa et fidel excedentia videantur, mirabilium tamen operum effectricem esse musicam non dubium st. Constat Saulum Solymorum regem, cum a malo daemonio vexaretur, adhibita citharae modulatione solitum curari, David ad vaticinandum psalterii cantum quasi quodam vehiculo mentem elevante usum fuisse, [Eliseum], magni [Eliae] carmelitarum embellished, it is content [just] to be taught."

Truly, if one considers this excellent part of philosophy—that is, music—its power, nature, beauty, and nobility (not being influenced by my exhortations but rather, spontaneously of his [own] accord), he will quickly come to follow the revered footsteps of Orpheus from Thrace, Amphion from Thebes, Arion from Lesbos, Mercury, Linus, Solomon, Pythagorus, Aristoxenus, Ptolemy, Chorebus, Lycaon, Prophrastus, Timotheus, and of the rest, who have obtained an immortal name by relying upon this teaching.5

These were the men whom the venerable ancients so admired that it was said that they stirred the wild beasts, possessed the hearts of men, recalled souls back into [their] bodies, influenced the souls of the dead toward compassion, and lured the strong mountain ash trees from the mountains with the sweetness of [their] song. Although these fabulous deeds seem to go beyond belief, still there is no doubt that music is capable of producing amazing achievements. It is well known that Saul—the king of the people of Jerusalem—was accustomed to being cured by summoning the playing of the lyre when he was harassed by an evil
David used the song of the psalter for prophesying, as if it were an instrument for a kind of lifting of the intellect. Elisha, a disciple of the great Elijah—the father of the Carmelites—called a lutist when he wished to prophesy. Who does not know that crying infants are quieted by the songs of the wet nurse, and that the ardor of boiling blood is extinguished with melodies; that horses with [their] ears quivering to the clang of the bugle are unable to stand in place? With trembling limbs they neigh [and] rear up on their hind legs much more frequently, thirsting for battle and Mars, [the god of war]. The author Priscianus asserts that among the Sicilians there was a fountain that seemed to dance to the sound of the lyre. Thus, music possesses, beyond doubt, an enormous energy and a powerful influence upon human souls, whether one may wish to soothe or excite. But if in this time of ours, so few miracles are happening by means of music, it is not the fault of art, which, besides the laws of nature, is [considered to be] the most perfect; rather, it should be charged to those using poor art. For if those [men]—the most esteemed musicians whom we mentioned above—were called back to life, they
His igitur rationibus moti praesens opus edidimus sperantes, etsi sint fortasse aliqui nunc viventes, qui livore stimulati detrahere quam proficere malint, futuros etiam apud posteritatem quam plures, qui sepulto invidiae veneno nostrum laborem laudent et operi nostro virtutis amore compulsi favorem adhibeant.

Operis igitur sit ista partitio. In primo libro subtilem practicam ponemus, in secundo theoricam accurate discutiemus, in tertio musicam semimathematicam, semiphysicam congrua ratione probabimus. Primum igitur, quid musica sit quidve harmonia, disseramus.

Finito prologo incipit tractatus, ubi primo quid sit musica quidve harmonia disputatur.

would say that the music of our time was not invented by them, [for] it has been rendered thoroughly unsuitable, absurd, and disconnected by the depravation of certain singers.

Therefore, moved by these reasons, we have published the present work. Although there may be some living at the present time who, stimulated by malice, prefer to detract rather than be helpful, we hope that with posterity there will be even more who, having buried the poison of envy, will praise our labor and, driven by the love of virtue, will bring favor to our work.

Therefore, let the division of this work be as follows: in the first book we will consider practice in great detail; in the second book we will accurately discuss theory; [and] in the third book we will examine music with a corresponding ratio of equal proportions devoted to mathematics and physics. But first of all, let us discuss what is music and what is harmony.

The prologue ends [and] the treatise begins, whereby in the first [chapter] it is discussed what is music and what is harmony.
Harmoniam atque musicam idem esse multi credunt, verum nos longe aliter sentimus. Ex quorundam enim musicorum sententiis longa investigatione collegimus harmoniam concordium vocum esse commiixtionem, musicam vero ipsius concordiae rationem sive perpensam et subtilem cum ratione indaginem. Musica autem triplex est; nam alia mundana, alia humana, alia vero dicitur instrumentalis. Mundanam atque humanam, quoniam speculativae theoricae sunt, in secondo libro tertioque pertractabimus; tertia autem, quae tota circa instrumenta versatur, consideratio priorem sibi vendicabit locum.

Instrumentum duplex est: aliud enim natura, aliud vero arte constat. Naturale instrumentum vox hominis est, quod naturaliter vocem elevare deprimereque possumus. Artis instrumentum dicitur, quod arte fiat non natura, ut monochordum et cithara et cetera, quae

Many people believe harmony and music to be the same thing but we feel very differently. For after a long investigation, we have concluded from the opinions of certain musicians that harmony is the union of concordant voices, but music is the theory of the concord itself, or if you prefer, a thorough consideration and minute investigation accompanied by reason. Furthermore, music is three-fold: for one type of music is called mundana; another type is called humana; but yet still another type is called instrumentalis. Since mundana and humana are speculative and theoretical, we will treat them in the second and third book, but the third aspect of music which deals entirely with the instruments will demand our first consideration.

The instrument is two-fold: one type consists of natural qualities, but the other type consists of artistic principles. The natural instrument is the voice of man, because man is able to raise and lower the voice naturally. An instrument is said to be of art because it is made

Prima autem consideratio a neotericis cantus firmus, a quibusdam vero cantus planus dicitur, secunda contrapunctus, quam ab antiquis organizationem dictam by art rather than by nature, such as the monochord, the cithara, and others that are subservient to the song. In respect to the most precise consideration of the practice of these instruments, there are three aspects which we should examine: namely, voice, sound, and rhythm, or if you prefer measurement. The term "voice," is too often taken to represent both the sound of men and the sound of instruments. Thus, it is the opinion of Aristotle in the book De Anima that "the voice is the sound of the animate being alone." But the voice is also the sound of inanimate beings such as musical instruments; [however], only according to analogy, since they sound differently. However, the term "sound" in the present circumstances is not taken in its simplest form, but as the sound of two or more strings being struck at the same time, or of two or more people singing at the same time. Similarly, rhythm is not considered in a simple fashion, but with a condition toward the proportions.

The first consideration is called cantus firmus by the new theorists; indeed, by some it is called cantus planus. The second consideration is called contrapunctus, a
fuisse constat; at tertia cantus figuratus, quae a plerisque organi cantus appellatur. Secundum hanc igitur triplicem considerationem compendium hoc nostrum dividemus.

In prima consideratione tria praeципue procurabimus. Primo instrumento per artem composito rectas eius divisiones erudiendis ad sensum monstrabimus et chordarum secundum divisiones percussarum sonitum, ut memoriae mandent, admonebimus. Secundo organum naturale per [arsum] et thesim idest per elevationem et depositionem sive per intensionem et remissionem cum artis instrumento copulantes psallere concorditer assuefaciemus, quousque sine eo legitime psallere didicerint. Tertio vero odas vel notulas, per quas omnis cantus dignosci, cantari componique possit, in plano designabimus.

structure that is known to have been named by the ancients. Finally, the third consideration is called cantus figuratus, which is [also] commonly called organi cantus. Consequently, we will divide this compendium of ours according to these three considerations.

In the first consideration we will attend to three aspects in particular. Firstly, we will show the correct divisions with the artificial instrument in order to instruct the students toward a proper understanding, and we will admonish them to commit to memory the sound of the striking strings according to the divisions. Secondly, we will become accustomed to singing harmoniously, uniting the natural instrument with the artificial instrument through arsis and thesis; that is, through the raising and lowering or, if you prefer, the stretching and relaxing [of the pitch], for however long it takes them to learn how to sing properly without it. Thirdly, as a matter of course we will allude to the points or notes in plainsong through which every song is able to be distinguished, sung, and composed.
Verum quia instrumentorum arte constantium diversa sunt genera, ne varietate disciplina fiat obscurior, unam chordam dividendi modum et regulam dabimus, unde monochordi a Graecis nomen assumptum est. Postea vero per alia transeuntes ad intentum finem deveniemus. Since the types of harmonious artificial instruments are diverse, [and] lest the teaching becomes unintelligible due to [this] variety, we will give the manner and rule of dividing one string; whence it has received the name monochord from the Greeks. Thereafter, while touching upon other matters, we will arrive at our intended purpose.
Regulare monochordum numeris et mensura subtiliter a Boetio dividitur. Sed illud, sicut theoricis utile iocundumque est, ita cantoribus laboriosum intellectuque difficile. Verum quia utrisque satisfacere polliciti sumus, facillimam regularis monochordi divisionem reddemus, quam non modico labore nemo nos arbitretur invenisse, quippe qui illam multis vigiliis antiquorum praecpta lectitantes et neotericorum vitantes errorem cum sudore repperimus. Et eam quilibet vix dum etiam mediocriter eruditus facile intelligere poterit.

Sumatur itaque cuiusvis longitudinis nervus sive chorda, quae super lignum aliquid habens concavitatis extendatur; locus autem extremus, cui nervus alligatur, puncto a signetur. Alius locus e regione procul positus, quo nervus trahitur et torquetur, puncto $q$ signetur. Quantitas autem $q$ a, idest totius chordae longitudo, in duas partes

The regular monochord is accurately divided by Boethius with numbers and measurement. Although it is agreeable and useful for theorists, it is laborious and difficult for singers to understand. Truly, since we have promised to satisfy both [the theorists and the singers], we will render an extremely easy division of the regular monochord. Let no one think that we came upon it with ordinary labor, inasmuch as we devised it with hard work during many sleepless nights, reading and re-reading the precepts of the ancients and avoiding the error of the modern theorists. Anyone even moderately educated will be able to easily understand it.

Therefore, let a string or, if you prefer, a cord, of any length be taken—which is stretched over wood having some degree of concavity—and let the furthest place to which the string is bound be marked by the point a. Let another place, positioned in a straight line at a distance from which the string is drawn and stretched, be marked
dividatur aequales et
aequae distantiae punctus
h littera notetur.
Dividemus iterum per
medium quantitatem chordae
h a et in medio divisionis
d constituemus. Quantitas
h d iterato secabitur et
in sectionis medio f
collocabitur.

Idem quoque de alia
chordae medietate
faciendum intellige
scilicet h q, quoniam in
prima divisione loco medio
p figurabitur; et in
divisione h p aequaliter
ab utraque distans ponatur
littera l et inter l et p
servata eadem
intervallorum regula n
immittatur. Quod si f n
per medium diviserimus,
litteram i signabimus.

Per hanc autem medium
divisionem ulterius ad
partes minutiores,
quosque alias divisiones
fecerimus, non deveniemus.
Sed totum a q per tria
dividemus et a littera q
mensurantes in fine
trientis ponetur m et in
besse e. Deinde e q per
tria iterum dividatur et a
littera q versus e
venientes in besse signum
½ quadrum configetur et

by the point q. Now let
the quantity q-a—that is,
the length of the entire
string--be divided into
two equal parts, and let
the point of equal
distance be marked by the
letter h. Then we will
divide the quantity of the
string h-a in half, and in
the middle of the division
we will place [the letter]
d. Again, the quantity
h-d will be divided and f
will be placed in the
middle of the section.

Understand that the same
also should be done in
respect to the other half
of the string—that is,
h-q--since [the letter] p
will be formed midpoint in
the first division. And
in the division h-p, let
the letter l be placed at
an equal distance from
both, and with the same
rule of the intervals
having been maintained
between l and p, let n be
inserted. But if we will
divide f-n in half, we
will inscribe the
letter i.

However, we will not
proceed any further to the
smaller parts of this
half-division until we
have made other divisions.
Thus, we will divide the
whole a-q by three parts:
measuring from the letter
q, we will place [the
letter] m at the end of a
third part and [the
letter] e at the end of
the two-thirds part.
Then, let e-q be divided
quantitate $\frac{1}{4}$ quadri et $q$
duplicata signetur $b$.

Sed iterum $m \cdot h$ per
medium secabimus et medium
sectionis punctum $k$
littera colorabimus. Quod
si quantitatem $k \cdot q$
duplicemus, in fine
duplicationis $c$ ponemus;
sed inter $e$ et $\frac{1}{4}$ quadratum
aequalibus utrimque
spatiis $g$ situetur. Si
autem $g \cdot q$ in duo aequalia
partiamur, o littera
signabitur sicque totum
monochordum legitima
partitione divisum est, ut
in subjicet figura
cognoscis [figura 1].

again by three, and coming
from the letter $q$ toward
e, the square $\frac{1}{4}$ sign will
be transfixed at the two-
thirds point, and round $b$
will be inscribed with the
quantity of square $\frac{1}{4}$ and $q$
doubled.\footnote{9}

Now again we will divide
$m-h$ in half and we will
mark the middle point of
the section with the
letter $k$. But if we
double the quantity $k-q$,
we will place $c$ at the end
of the duplication;
however, let $g$ be placed
between $e$ and square $\frac{1}{4}$
with equal lengths on both
sides. And if we divide
$g-q$ into two equal parts,
it will be marked with the
letter $o$. Thus, the whole
monochord has been divided
by a legitimate partition
as you [may] examine [for
yourself] in the figure
below [see Figura 1].
Figure 21. Figura 1 of the *Musica practica*, 5.
Taliter autem monochordo diviso superest quantitates illas altius limatiusque considerare. Sciendum igitur totam illam inter a et b intercapedinem tonum vocari et a Graecis phtongon, quod apud nos sonus interpretatur. At hoc tali exemplo facilius intelligetur: Percutiatur nervus in tota sui longitudine extensus noteturque sonus. Deinde supponatur digitus vel quidpiam aluid subtilius et non magna latitudine sparsum iterumque chorda percutiatur; fiet, ut aliquanto altiorem sonum emittat. Cumque sonum acutiorem sono gravi sive graviorem acuto comparare volueris, toni esse distantiam deprehendes. Sin vero sonum b sono c comparabis, semitonium fiet; non quod toni sit dimidium, sed quod ad integritatem toni vox non ascendit, imperfectus tonus appellatur. De hac tamen semitonii imperfectione practicus non supra modum sollicitetur, quoniam est maxime speculativa et a cantoribus practicis aliena. Sed quod non sit perfectus tonus, practicus cognoscat oportet. Subtiles enim huiusmodi

With the monochord having been divided in such a manner, there remains to be considered in a more profound and refined manner those quantities [that lie] within such a monochord division. Therefore, it is necessary to know that the whole interval between a and b is called tonus, ([or] phtongon by the Greeks), which is interpreted in our work as sonus. But this will be more easily understood with the following example: Let the stretched string be struck in its entire length and let the sound be noted. Then, let the finger, or something else more accurate and indeed not very wide, be placed above [the string] and again let the string be struck: the result will be that it emits a considerably higher sound. And when you will have considered a comparison of the higher sound with the low sound or, if you prefer, the lower sound with the high sound, you will perceive the distance to be that of a tone. But if, on the other hand, you will compare the sound b with the sound c, the result will be that of a
disputationes in secundum librum differemus.

Ilia autem quantitas sive intercapeo, quae inter c et d extenditur, tonus est et inter d e similiter tonus, sed inter e f semitonium, inter f g tonus, inter g h tonus, inter h i semitonium, inter i k semitonium, inter k 1 tonus, inter 1 m tonus, inter m n semitonium. Fit n o tonus, o p tonus; et ita soni, qui ex percussione affinimum vicinarumque divisionum proveniunt, ad se invicem comparati tonum aut semitonium emittunt. Sed distantium comparatio tonorum plures aut semitoniorum species efficit. Unde inter c et e spatium, quoniam ex tonis duobus constat, ditonus sive bitonus semitone. [And] it is not called an imperfect tone because it is half of a tone, but because the note does not rise toward the completeness of a tone. Nevertheless, in regard to this imperfection of the semitone, it is not practical [for us] to tamper with it beyond moderation, since it is very speculative and unrelated to practicing singers. However, because the tone may not be perfect, the practicing musician should become acquainted [with it]. Truly, we will postpone in-depth discussions of this matter until the second book.

Now that quantity or, if you prefer, interval extended between c and d is a tone, and likewise there is a tone between d and e, but there is a semitone between e and f, a tone between f and g, a tone between g and h, a semitone between h and i, a semitone between i and k, a semitone between k and l, a tone between l and m, [and] a semitone between m and n. A tone is produced [between] n and o and [between] o and p; likewise the sounds which come forth from the striking of the adjoining and neighboring divisions--having been paired together in turn--emit a tone or a semitone. But a comparison of the
dicitur. Sed a c
distantia semiditonus est
appellata, quoniam
imperfectus ditonus toni
medietate sublata
conficitur. Sed b e
diatessaron, quia quatuor
vocum est capax, sive
tetrachordum dicitur, quod
quatuor chordarum divisio
est et intercapedo. Est
enim una chorda sive vox
b, alia c, tertia d,
quarta e, inter quas tria
clauduntur intervalla, duo
scilicet toni et unum
semitonium.

Boetius per tetrachorda
monochordum dividit hoc
modo: b e primum
tetrachordum, secundum e
h, ita quod e finis primi
et secundi principium est;
et simili modo h l. Sed
quando praecedentis finis
pro sequentis tetrachordi
principio sumitur,
tetrachordum coniunctum
dicitur, quod Graeci
synemmenon appellant.
Quando autem h ideant primi
sive praecedentis finis
pro secundi sive sequentis
principio non sumitur, sed
sequens tetrachordum a l
quadrato sumit initium et
per k l procedendo in m
sistitur, disiunctum
latine, graece vero
distances of the tones or
semitones produces several
species. Whence, the
distance between c and e
is called a ditone or, if
you prefer, a bitone,
since it consists of two
tones. But the distance
[from] a to c is called a
semitone, since an
incomplete ditone is
constructed by taking away
half of the tone. But
the distance from] b to e
is called a diatessaron,
because it is capable of
four notes or, if you
prefer, it is called
tetrachord, because it is
the division and interval
of four strings. For
there is one string or, if
you prefer, one note--b,
another c, a third d,
[and] a fourth e, among
which three intervals are
confined—that is, two
tones and one semitone.

Boethius, by means of
tetrachords, divided the
monochord in this manner:
the first tetrachord is
b-e; the second
[tetrachord] is e-h. Thus,
e is the final of
the first [tetrachord] and
the beginning of the
second [tetrachord]; and
likewise h-l. But when
the final of the preceding
tetrachord is selected for
the beginning of the
following tetrachord, the
tetrachord is called
coniunctum, which the
Greeks call synemmenon.
However, when h—that is,
the final of the first or,
if you prefer, the
preceding [tetrachord]--is
diezeugmenon nuncupatur, quod illa [contermina] tetrachorda communi fine non [copulantur], sed principium secundi a primi fine per toni distantiam dirimitur. Estque quintum tetrachordum m p, quod hyperboleon, hoc est excellentium, dicitur. Omnes enim illius chordae omnes aliorum tetrachordorum chordas acumine sublimitateque superant.

Primum autem tetrachordum graece hypaton, quod est principalium sive inferiorum latine, secundum tetrachordum graece meson, romane mediarum. Sic autem divisa est harmonia, quoniam natura docente sic regitur, ut post duos tonos semitonio temperetur. Chordae autem, quarum nomina sunt diversa, octo numero sunt, hoc est: hypate, parhypate, lichanos, mese, paramese, trite, paranete, nete. Hypate principalis dicitur; unde Graeci consulem hypaten vocant.

The first tetrachord [is called] hypaton in Greek, which is principalium or inferiorum in Latin; the second tetrachord [is called] meson in Greek, [and] mediarum in the Roman manner. Thus, harmony has been arranged --since it is governed in this manner with nature being the teacher--so that after two tones it may be tempered with a semitone. Now the strings, whose names are diverse, are eight in number--that is: hypate, parhypate, lichanos, mese, paramese, trite, paranete, and nete. The first
Parhypate hoc est iuxta [principalem]; lichanos dicta est, quoniam iuxta Boetii sententiam indice, qui lichanos graece dicitur, percutiebatur vel tangebatur primo digito hypaten feriente; mese idest media, quod in heptachordo medio loco ponatur; paramese idest iuxta medium; sed trite dicitur, quod ante neten sit tertia; paranete hoc est prope neten et nete inferior non quidem sono, sed locutione.

Secundum vero, quod hae chordae in diversis tetrachordis aptantur, diversa cum quodam additamento nomina sortiuntur. Dicitur enim: hypate hypaton, parhypate hypaton, lichanos hypaton; et sequitur: hypate meson, parhypate meson, lichanos meson, mese, trite synemmenon, paranete synemmenon, nete synemmenon conjunctim. Sed a mese disiungitur per tonum paramese et string is called hypate; whence the Greeks call the consul the hypaten. [The second string is called] parhypate, for this is next to the first. [The third string] has been named lichanos--according to the opinion of Boethius--because it will be struck or plucked with the first finger striking hypate--that is, by the forefinger--which is called lichanos in Greek. [The fourth string] is called mesé--that is, media, because it is placed at midpoint in the heptachord. [The fifth string] is called paramese--that is, next to the middle, but the [sixth string is called] trité because it is a third before nête. The [seventh string], which is next to nête, [is called] paranète; and [finally] the [eighth string is called] nête--certainly not lower in sound but rather, [last] in [this] discourse.

In addition, due to the fact that these strings are appropriated in the different tetrachords, diverse names are selected with a certain addition, namely: hypate hypaton, parhypate hypaton, lichanos hypaton, and accordingly: hypate meson, parhypate meson, lichanos meson, mese, trité synemmenon, paranete synemmenon, nête synemmenon are conjunct. But paramese is separated

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
sequitur: trite
diezeugmenon, paranete
diezeugmenon, nete
diezeugmenon, trite
hyperboleon, paranete
hyperboleon, nete
hyperboleon. Sed quoniam
mese non erat medio loco
posita, cum quatuordecim
essent nervi, superadditus
est nervus, qui a Graecis
proslambanomenos vel
prosodos dicitur, a
nostris vero acquisitus
vel assumptus vel accessus
nuncupatur.

Cuilibet enim
tetrachordo si tonus
addatur, species
efficitur, quae diapente,
quia vocum quinque est,
vocatur aut pentachordum,
quia chordarum quinque,
tonorum trium cum
semitonio est, ut a e.
Sed a diapente semitonio
subtracto tritonus
efficitur, ut f †. Post
diapente priores usque ad
diatessaron replicantur
hoc modo: diapente cum
semitonio, ut a f,
diapente cum tono ut c h,
diapente cum [semititono]
ut a g, diapente cum
ditono ut c † quadrum.
Sed diapente iuncta cum
diatessaron componit
speciem, quae diapason
dicitur, quod est per
totum vel de toto latine,
quaniam omnis concertus,
quam symphoniam Graeci
dicunt, et omnes harmoniae
differentiae intra ipsam
continentur. Propterea ab

For if a tone is added
to any tetrachord, a
species is produced which
is called diapente—due to
the fact that it contains
five tones—or pentachord
because it contains five
strings [and] four
intervals—[that is,]
three tones with a
semitone such as a-e. But
a tritone is produced when
a semitone is subtracted
from the diapente such as
f-†. [The intervals]
after the diapente all the
way to the diatessaron are
replicated by the ancients
in this manner: the
diapente with a semitone
such as a-f, the diapente
with a tone such as c-h,
the diapente with a
semititone such as a-g,
[and] the diapente with a
ditone such as c-†. But
the diapente united with
the diatessaron forms the
species which is called
diapason; in Latin [it is
referred to as] per totum
antiquis recte dictum est
post diapason
reiterationem semper esse.
Septem autem intermedia
discrimen aliquod habent;
unde illud sapienter a
Virgilio in VI° Aeneidos
positum est: Nec non
Threicius longa cum veste
sacerdos / Obloquitur
numeris septem discrimina
vocum.

Octava vero similis est
[primae]; ideo Gregorius
differentes litteras
septem et non amplius
posuit, sed easdem repetit
ac iterum ponit. Quoniam
inter primam et octavam
maxima conformitatis
affinitas similitudoque
reperitur, adeo ut
differre non sentiantur
nisi penes acuminis
gravitatisque
diversitatem, ideo
diapason a h vocabatur
gravis, sed h p acuta.
Sed easdem litteris,
quibus gravis signabatur,
acuta quoque diapason
notabatur. Sed notandum,
quod phthongi inter se sono
quidem sunt aequales,
quantitate autem figurae,
secundum quod plus minusve
gravitatis habent, maiora
minorave spatia continent.

or de toto,32 since every
concord—which the Greeks
call symphonia—and all
the different harmonies
are contained within it.
Therefore, it was
correctly stated by the
ancients that there is
always a reiteration after
the diapason. However,
the seven [intervals] in
between [the prime and the
diapason] have some
distinction; whence that
which Virgil wisely stated
in Book VI of the
Aeneid: The Thracian priest with
the long garment plays the
seven differences of the
tones to [the strains of
their] melodies.33
Quo fit, ut tonus a b
duplum intervallum habeat
tono h i quadro comparatus
et c d similiter ad k l.
Et pariter de semitonis
aliisque maioribus
speciebus dicendum, ut in
figura monstratur. At
deinceps non ita ponendum,
ne inchoantium offuscetur
intelligentia; sed
quemadmodum toni inter se
sono sunt aequales, ita
intercapedes ponemus
aequales. Semitoniorum
vero minuemus intervalla,
ut manifeste constet tono
minus esse semitonium.
Omnia autem praedicta
subjicit figura patefaciet
[figura 2].

Videsne dispositionem
figurae, ubi graeca
chordarum nomina et
latinas litteras
impressimus? Licet igitur
tota musicae differentia
unica diapason continetur,
duas tamen posuimus, quas
[dicimus] bisdiapason, ut
Boetii ac Graecorum
doctrinam imitaremur,
Enchiridion vero
disdiapason appellat.
Ex his manifestatur
illorum error, qui male
ordiuntur— inchoant

Thus, it results that
the tone a-b contains
twice as much space as the
tone h-i; and likewise
[when] c-d [is compared]
to k-l. And it should
be said—as it is shown in
the figure—in regard to
the semitones and the
other larger species as
well. But it should not
be discussed immediately
lest the knowledge of the
fundamentals are obscured;
for indeed, just as the
tones are equal to one
another in sound, thus we
will arrange the equal
intervals. Truly, we will
diminish the intervals of
the semitones, so that it
is clearly ascertained
that the semitone is less
than the tone. The figure
below will reveal
everything that has been
mentioned [see Figura 2].

Do you see the
arrangement of the figure
where we have marked the
Greek string names and the
Latin letters? Although
all the diversity of music
is contained within a
single diapason,
nevertheless, we have
established two
[diapasons] which we call
bisdiapason in order to
imitate the teaching of
Boethius and the Greeks;
but the Enchiridion calls it
disdiapason.
Figure 22. Figura 2 of the Musica practica, 8.
Source: Johannes Wolf, ed., Musica practica, 10.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
namque sic: Viginti sunt litterae: \( \Gamma A B C D E F G \) 
\( a b c d e f g a b c d e \)--quoniam non viginti sed septem tantum sunt diversae, post quas non aliae, sed eadem quasi iterum renascuntur.

Sed hi a littera \( G \) incipiunt finiuntque in tertia \( e \), quoniam primam sui nominis litteram Gregorium ponere voluisse fabulantur eamque graeca appellacione \( \Gamma \) nominasse, quoniam a Graecis musicae documenta tradita sunt. Sed etsi hoc illis sit permissum, in divisione tamen a veritate maxime aberrant, cum octo graves, septem acutas et superacutas quinque dicant; nam octavam litteram et primam in acumine tantum et [gravitate] differre monstratum est.

Sed ulterius Boetii auctoritate, ut aiunt, munire se conantur. Dicunt namque primam acutarum mesen, quae est \( h \) et littera a secunda. Colligitur ergo inter graves ab ipsis \( G \) collocari. Etsi a Boetio dicatur \( G \) inter graves, a Gregorio non bene dictum propter additionem litterae \( \Gamma \), quoniam

Their error is revealed from these things, which are badly arranged, for they begin in this manner: There are twenty letters: 
\( \Gamma A B C D E F G a b c d e f g a b c d e \). Whereas, there are not twenty different [letters] but only seven, after which not others but the same [notes]--as it were--are reborn again.

These [men] begin from the letter \( G \) and end on the third \( e \), because they say that Gregory wished to set down the first letter of his own name and name it with the Greek appellation \( \Gamma \) [gamma], since the documents of music were handed down from the Greeks. But although this may have been permitted to them, nevertheless, in [their] division they deviate greatly from the truth, since they speak of eight graves, seven acutae, and five superacutae, for the eighth and the first letter are shown to differ only in respect to [their] highness and lowness.

Further on, they attempt to justify themselves--so they say--with the authority of Boethius. For they call the first [note] of the acutae--\( \text{mesē} \)--which is the letter \( h \) and the second \( a \). Therefore, they conclude that \( G \) is to be placed among graves. Although it may be that \( G \) was named among graves by Boethius,
quemadmodum a primum ad h vel ad a secundum, ita G se habet. Sed h (a) ab a primo in acumine tantum differt, ergo et G a G in acumine tantum differet. Datis ergo viginti litteris sic divisio fieri deberet, ut septem graves, septem acutae et sex fierent superacutae. Sed nec Gregorio placuit litterae additio, quoniam quindecim tantum usus est. Tinctoris vero ab hac ratione alienus scilicet primo gravissimum; secundum est grave, tertium acutum. Verum unde hie error cantores invaserit, paulo post ostendemus. Nunc ad aliorum doctrinam declarandam accedamus.

it is not properly named by Gregory on account of the addition of the letter G, since just as the first a is held with respect to h or with respect to the second a, thus G is held with respect to G. But h (a) differs from the first a only in highness [of pitch]; therefore, G also differs from G only in highness [of pitch]. Consequently, the division with the twenty given letters should be created in this manner: there are seven graves, seven acutae, and six superacutae. [Obviously] the addition of a letter was not accepted by Gregory, since he only used fifteen [letters]. But Tinctoris—contrary to this opinion—calls the first [division]—that is, gamma--gravissimum, the second [division] graves, and the third [division] acutae.\(^{38}\) Truly, we will make known a little later how this error was spread among the singers. Now let us undertake to explain the teaching of others.
Omnès quidem has litteras viginti Guido, monachus fortasse melior quam musicus, tetrachordo utens, dum hexachordum componit, amplexus est. Et ad huiusmodi hexachordum hac ratione compulsus est, quoniam senarius numerus a mathematicis perfectus dicitur, quia partes eius aliquotae simul sumptaæ ipsum senarium simul constituunt, scilicet 1. 2. 3, quae simul sex componunt, et quaelibet huius hexachordi chorda a sex primis syllabis sex dictionum hymni sancti Johannis Baptistae nomen accepit, scilicet:


Unde si recte post quemlibet punctum primam syllabam inspexerimus, has voces sex extrahemus: ut, re, mi, fa, sol, la; et unaquaque a sibi proponqua omnibus seriatim positis per tonum distat praeter fa, quod a mi per

Certainly, Guido (perhaps a better monk than a musician), embraced all twenty of these letters, using the tetrachord up to the time that he composed the hexachord. And he was compelled to a hexachord of this kind, since the number six is called perfect by mathematicians, because its aliquot parts taken together constitute the senaria itself, namely 1–2–3, which [added] together make up the [number] six.39 And each string of this hexachord receives [its] name from the first six syllables of the six phrases of the hymn of Saint John the Baptist:

UT queant laxis. REsonare fibris. MIra gestorum. FAmuli tuorum. SOLve pollutii. LABii reatum. Sancte Johannes.

Whence, if we properly observe the first syllable after any period, we will acquire these six notes: ut, re, mi, fa, sol, la; and each and everyone is arranged next to each other in a series, distant from one another by a tone.
semitonii spatium
discedit. Habet igitur
duos tonos sub se duosque
supra. Et cum prima
littera g, quae r dicitur,
ut syllaba posita fit
totum, quod Gamaut
nuncupatur; et ex a
littera et re syllaba fit,
quod dicitur a re.
Similiter ex b littera et
mi syllaba b mi, ex c
littera et fa syllaba c
fa, ex d et sol d sol, ex
e et la e la.

Et ut Boetii doctrinam
imitaretur, quae per
tetrachorda totam dividit
harmoniam, cum ad quartum
locum pervenit videlicet c
fa, iterum hexachordum
quasi propugine facta
aliud emittit. Si autem
cum c fa ut syllaba
ponatur, totum compositum
c fa ut appellatur et
continuatur cum d sol re
et cum e la mi, ubi primum
finitur hexachordum. Sed
cum ex litteris f
sequatur, cum fa
tetrachordi secundi
syllaba ut iterum
collocatur, quae secundi
tetrachordi quarta vox
est. Itaque cum sit f fa,
ut sibi iuncta tale nomen
acciplace; et sequitur cum
with the exception of fa,
which is separated from mi
by the interval of a
semitone. Therefore, [the
series] will contain two
tones below [mi] and two
[tones] above [fa]. And
when the first letter g
--which is called r--is
placed with the syllable
ut, a unit is produced
which is named Gamaut
[Gamma]; and that which is
called a re is produced
from the letter a and the
syllable re. Similarly,
b mi [is produced] from
the letter b and the
syllable mi; c fa [is
produced] from the letter
c and the syllable fa;
d sol [is produced] from
the [letter] d and the
[syllable] sol; [and] e la
[is pro-duced] from the
[letter] e and the
[syllable] la.40

In order to imitate the
teaching of Boethius--
which divides all harmony
by means of the
tetrachord--[Guido], upon
arriving at the fourth
position--namely c fa--
produces another hexachord
again as if a descendant
had been born. However,
if the syllable ut is
placed with c fa, the
entire unit is called c fa
ut and it unites with d
sol re and e la mi,
whereupon the first
hexachord is completed.
But since f follows after
[these] letters, the
syllable ut is placed with
fa of the second
tetrachord--which is the
fourth note of the second
g sol re et cum a la mi et, ne se ignorasse similitudinem extremarum diapason includentium videretur, rursum hexachordum collocare incipit.

Et cum ex praeteritis tetrachordis duobus secundo videlicet et tertio duas voces habeamus ibi locatas, scilicet cum littera g sol re, ut sibi addita tali nomine nuncupatur scilicet g sol re ut et continuatur cum a la mi re, ubi [secundum] consumatur hexachordum duoque simulconiunctim copulantur, scilicet fa, mi: cum primo scilicet b fa, cum secundo $\frac{4}{3}$ quadrum mi, quorum quidem vocum, sicut litterae monstratae sunt inaequales esse, unam altiorem alia cognoscimus. Et sic tonus ille in duo semitonia divitit, et sequitur cum $c$ sol fa ut, quia, sicut secundum hexachordum ad primum in eo loco conjunctur, et totum compositum sic appellatur, scilicet $c$ sol fa ut. Continuaturque cum $d$ la sol re et sic deinceps e la mi, $f$ fa ut, g sol re ut, a la mi re, $b$ fa, $\frac{4}{3}$ quadrum mi sicut prius et possent hexachorda in infinitum multiplicari iuxta instrumenti sufficientiam.

tetrachord. Therefore, since it is $f$ fa, it will receive such a name [as $f$ fa ut when] ut is joined with it; likewise he continues with $g$ sol re and a la mi, and lest it seem that he has ignored the similarity of the extremes embraced within the diapason [that is, $\Gamma$-g], he begins to arrange a hexachord [once] again.

And then with respect to the two preceding tetrachords--that is, after the second and the third [tetrachord]--we have placed two notes there; that is, ut is added to the letter $g$ sol re [and] named with the following name, $g$ sol re ut, and it unites with a la mi re where the second hexachord is completed and the two [notes]--that is, $fa$ mi are joined together--namely $b$ fa with the first [and] square $\frac{4}{3}$ mi with the second. Indeed, we recognize that just as [these] letters have been shown to be unequal, one of these notes is higher than the other. And thus, that tone is divided into two semitones and is followed with $c$ sol fa ut, because as the second hexachord is joined to the first at this point, thus also the whole unit is named--that is, $c$ sol fa ut. And it unites with $d$ la sol re, and likewise e la mi, $f$ fa ut, g sol re ut, a la mi re, $b$ fa, [and] square $\frac{4}{3}$ mi in
Sed cum in omni scientia quandoque ad finem perveniendum sit, iterari hexachorda iam desinunt et propterea in c sol fa non ponitur amplius ut. Sed procedimus ad d la sol, ubi sextum hexachordum relinquimus. Septimum vero in e syllaba la perficitur.

Itaque posuit septem hexachorda propter septem voces differentes, ut sibi visum fuit, quod subiecta patefaciet figura. Videsne rectam Guidionis figuram? Ipse vero non sic, sed per iuncturas ponit digitorum hoc modo: [figura 3]

But since in every science a conclusion should be reached at some time, the hexachords cease to be repeated [any] further and therefore, ut is no longer placed on c sol fa. However, we proceed to d la sol where we conclude the sixth hexachord; and the seventh [hexachord] is completed on e with the syllable la.

And thus, [Guido] established seven hexachords for the seven different notes as it seemed [fitting] to him, which the figure below will reveal. Do you see the recta figure of Guido's [hand]? Truly, [Guido] himself did not [establish the gamut] in this way, but by means of the joints of the fingers he arranges [it] thus: [see Figura 3].

succession just as [it did] before; for the hexachords can be multiplied up to infinity according to the capacity of the instrument.
Figure 23. Figura 3 of the Musica practica, 11.
Beautiful page from a book written in Latin, discussing the error of some in respect to the aforementioned

Although not everything that is established by [Guido] in regard to these matters may be uncovered by us, nevertheless, I do not believe on that account that the reader will think that we acted without a purpose. Truly, if God will favor our desires and efforts, [these things]--which are established by [Guido] and others in a disorderly and confused manner--will be presented at their own proper time and at their proper places; [and] not even one iota will be left untouched that is necessary for [this] undertaking. Indeed, soon we will also teach other things, which they themselves knew less about and in which [their] error has mocked them.

Truly, it was discussed and demonstrated above that the synëmmenôn tetrachord is conjunct but the diezeugmenôn [tetrachord] is disjunct. However, some [people], being ignorant of this (as we have found in a long dispute with the Spaniard Tristan de Silva--our dearest friend, and a man with the most sagacious talent) establish the
hoc synemmenon, deinde
hyperboleon. Et sic
distare faciunt [neten]
hyperboleon a
proslambanonomo per tres
chordas ultra bisdiapason,
quod esse contra veritatem
et Boetii doctrinam
manifestum est. Ipse
namque Boetius
accuratissime istud
declarat primo libro
capitulo, quod incipit:
Sed quoniam rursus
mese . . . . Ponit
insuper evidenter
declaratum numeris et
mensurata figura quarto
libro capitulo, quod
incipit: Duo quidem
tetrachorda, quae sibimet
coniuncta sunt, a mese
vero disiuncta . . . .
diezeugmenon [tetrachord]
after they reach mesē.42
After this, they place the
synemmenon [tetrachord],
[and] then the
hyperbolaiōn. And thus,
they cause the nētē
hyperbolaiōn to stand
apart from the
proslambanonomos by [the
distance of] three strings
beyond a bisdiapason,
which is clearly contrary
to the truth and the
teaching of Boethius. For
Boethius himself declares
this very accurately in
[his] first book, in the
chapter that begins:
"Sed quoniam rursus
mesē . . . ."43 Moreover,
he clearly makes the
statement with numbers and
a measured figure in [his]
fourth book, in the
chapter that begins:
"Duo quidem tetrachorda,
quae sibimet coniuncta
sunt, a mesē vero
disiuncta . . . ."44

Sed de his in theoricis
nostris neque hic aliquid
allegassem, nisi quod
multorum circa hoc error
ostenditur et istorum
ipsorum, quorum multi
facile credentes sequuntur
disciplinam. Marchetus
vero non sic, sed a mese
ponit disiunctum, post
quod hyperboleon, deinde
synemmenon et sic chordas
decem et octo collocat;
quibus una inferius
scilicet gamma et alia
superius scilicet e
superaddita ad viginti
chordas numerus excrescit.

I would not have
mentioned anything about
these things in our
theories, nor here, except
that the error of many
[people] is shown in
regard to this, and of
those very ones whose
method of teaching many
[people] follow, believing
[it] with ease. Truly,
Marchettus,45 [does not
arrange them] in this way;
rather, he places a
disjunct [tetrachord] from
mesē after which he sets
down the hyperbolaiōn,
then the synemmenon, and
thus he employs eighteen
strings.46 This number

Iste enim Rogerius Caperon sic ait: Quatuor sunt figurae, quae additae sunt in cantu, scilicet: coruph, synemmenon, apotome et crisis. Coruph appellat Gamma, quia increases to twenty strings when a [string] is added below—namely gamma --and another [string] is added above—namely e.

In my opinion, if anyone wishes to understand [this] in a sound manner, one can say that the remaining [strings] are arranged in such a way with the synemmenon tetrachord removed. Then the synemmenon tetrachord --which ought to follow after mese--is placed after the nētē hyperbolaiōn, since it is similar to mesē. And thus, it has been arranged so that it does not hinder the diezeugmenon. Yet, it may be preserved in many other ways. Indeed, I do not doubt that [Marchettus] may be saved, since Christ on the cross prayed for those who know not what they do. A certain brother--the Frenchman Johannes Carthusiensis--saves him by saying that he is "both untrained and deserving of chastisement." However, I value this Marchettus so much that I have no doubt that four marchetti could be swallowed down together in one gulp by the Frenchman Roger Caperon.50

For this Roger Caperon said thus: "There are four figures that are added in the song, namely: coruph, synemmenon, apotome, and crisis. He calls gamma coruph because
addita, synenummenon $b$, apotome vero $\delta$; sed crisim appellat $e$ superacutam, in qua sequaces Guidonis ponunt $la$.

Synenummenon bene dicit esse $b$, si intelligat distantiam semitonii ab $a$ in $b$, quoniam ipse non declarat; bene etiam dicit apotomen, si intelligat distantiam $b$ et $\delta$, quoniam sic a Boetio et a Philolao appellatur, quod maius semitonium dicimus. Et sic viginti chordas ponit in errorem decidens aliorum.

The $b$ is properly named synēmmenon if one considers that there is the distance of a semitone from $a$ to $b$, (although he does not state this himself). The apotome is also properly named if one considers the distance between $b$ and $\delta$, since it is named thus by Boethius and Philolaus; we call this the major semitone. And thus, sinking into the error of others, [Roger Caperon also] establishes [a total of] twenty strings.
A BRIEF NOTE CONCERNING VARIOUS INSTRUMENTS

With the division of the regular monochord having briefly been shown, it remains [for us] to teach how to alternately raise and lower the human voice, in accordance with the rule of this [monochord]. However, we will better understand this if the knowledge of the various instruments is made clear to us first while we follow the most excellent footsteps of the truth, in order that we may also know how to combine the natural organ with other instruments. However, some of these instruments make the pitches higher with excessive tension, or lower the same with relaxation and produce low [pitches]. There are also strings that differ both in length and thickness, as on the cithara, the lyre, the polychord, the clavichord, the clavicembalo, the psalter, and many other instruments, to which new names have been assigned by posterity, and of which we will make clear mention of in the second book.

Nevertheless, none of these things are able to escape from our [monochord] division. Indeed, the strings of the monochord, which are of the same thickness, cannot escape from our division. For the strings of the monochord, which are of the same thickness, cannot escape from our division.
longitudinis et extensionis, si in eadem distantia fuerint percussae, eundem necessario sonum emittent, quemadmodum monochorda repperimus antiqua. Sed secundum quod propinquius vel distantius a loco/ubi torquentur, unaquaque percutitur, graviore acutioreme secundum proportionem divisionis superius datam sonum emittit.

Nunc autem non omnes chordae eiusdem grossitiei nec eadem extensione sunt temperatae. Ideo si a memoria caderet creberrimus musicae usus, consonantiarum veritatem per ista monochorda minime invenire possemus, sed ad priorem divisionem recurrentes sonos connotaremus. Si quis enim istud concorditer aptare voluerit, ad nostri instrumenti sonum convertatur, et illo perpenso istud cognoscet.

Sunt tamen aliqua ex novis monochorda unam habentia diapason ad partem acutiorem isto modo divisam; quoniam sex saltem chordae illo modo sunt temperatae et eiusdem sunt grossitiei, et tunc monochord—which are of the same thickness, length, and tension—will emit the same sound by necessity, if they have been struck from the same distance, just as we have discovered with the ancient monochord. But [the string] emits a lower or higher sound according to how each is struck—either closer or farther from the place where it is wound, in accordance with the proportion of the division given above.

Now not all of the strings are of the same thickness, nor are they tuned with the same tension. Therefore, if the most frequent use of music were to fall from [our] memory, we would not be able to find the truth of the consonants through those monochords, but we would make note of the sounds [by] reverting to the previous divisions. For if anyone should wish to adapt such a division concordantly, he would turn to the sound of our instrument [i.e., the monochord], and he would become acquainted with the former by a careful consideration of the latter.

Nevertheless, among the new monochords there are some, containing a single diapason, that are divided in the higher part in this manner—since at least six strings are tuned in that manner and are of the same
acumen aut gravitatem
parva vel magna chordarum
intercapedo tonorum aut
aliarum specierum secundum
commensurationem
proportionis efficit. Sed
quae ita sunt facta,
facillime temperantur,
quoniam unicumque sono
eiusdem diapason sua
octava facillime
concordatur.

Sunt et alia, quorum
chordae sunt contrario
modo dispositae, quoniam
quanto digitus
superpositus ad locum, in
quo torquetur,
appropinquat, tanto sonos
reddunt graviiores et e
contra, ut lyra. Sed hoc
nosta divisioni non
obstat, quoniam chordarum
impulsio non fit ex parte
mediae chordae— a loco
scilicet, a quo torquetur,
ad h—, sed a loco
ligaturae ad h. Sic ergo
quanto digitus
superpositus magis
appropinquat ligaturae
chordae, tanto sonus
acutior erit, quoniam
chorda brevior; et quanto
magis ad locum, in quo
torquetur, appropinquat,
tanto gravius sonat, quia
longior chorda est.

There are also other
[instruments], such as the
lyre, whose strings are
arranged in the opposite
way, since however much
the finger that is
superimposed upon the
string approaches the
place where it is wound,
to the same degree they
produce the lower pitches
and vice-versa. But this
is not in opposition to
our [mono-chord] division,
because the pressure of
the strings is not made by
the middle part of the
string— that is, between
the place where it is
wound and h— but rather,
between the place where it
is tied and h. Thus, the
more the finger that is
super-imposed [upon the
string] approaches the
place where the string is
tied, the higher the pitch
will be, because the
string is shorter; and the
more it approaches the
place where [the string]
is wound, the lower it
sounds, because the string
is longer.
Si hoc igitur instrumentum dividere voluerimus, permutatis litteris transpositis et idem eveniet, hoc est: h littera, ut prius erat, media remanente transponatur q ad locum a et a ad locum q et reliquae litterae unaquaque in alterius locum transferantur.

Est autem tonus in duo semitonia divisus in quolibet novorum instrumentorum perfecto, sicuti nostro meses et parameses per trite synemmenon, de qua divisione paulo post dicemus. Quando vero tonum in talibus facere voluerimus, duas chordarum divisiones transire nos decebit. In hoc igitur instrumento usque ad semitonia sic disivo plures chordae ponuntur, aliae scilicet grossiores, aliae vero subtiliores.

Utuntur autem nunc quinque sic dispositis, ut grossior in tota sua extensione sonet tono sub proslambanomeno, quod dicimus Γ ut, secunda parhypate hypaton diatessaron distans ab ea, tertia [hypate] meson

If we wish to divide this instrument, the same [division] will result with the exchange and transposition of the letters—that is, the letter h remains in the middle as it was before, [the letter] q is transferred to the place where a was, a [is transferred] to the place where q was, and each one of the remaining letters are transferred to the place of the other.

Now the tone is divided into two semitones on any of the new chromatic instruments, just as on our [monochord] the mesē and the parameseē are divided by the tritē synēmmēnēn—[but] we will speak about this division a little later. Truly, when we wish to make a tone on such [instruments], it will be necessary for us to pass through two divisions of the strings. Consequently, many strings are placed on this instrument, having thus been divided as far as the semitones; naturally some [of the strings] are thicker and others are thinner.

And now they make use of five [strings] arranged in such a manner so that the thicker [string]—in its entire extension—sounds a [whole] tone below proslambanomenos, which we call Γ ut; the second [string]—parhypatē
ditono altior ista; sed quarta mesen pronuntiet, quinta paraneten diezeugmenon, sive netes synemmenon sonum emittat, diapason et diapente sonans cum prima. Nec tamen hoc de necessitate fit. Aliis enim modis diversis concorditer disponi possunt, ut prima sit proslambanomenos, secunda lichanos, tertia mese et aliae alibi, et istae similiter alibi iocari possunt ad arbitrium pulsantis. Sed quia hoc nunc magis in usu est, sic potius posuimus.

In aliis vero instrumentis, quae spiritu sonant, calamorum amplitudo secundum superius datam proportionem acumen faciet et gravitatem. Itaque calami, qui in duplo fuerint ampliores, diapason gravius sonent, et alii intermedii secundum maiorem minoremve grossitiem graviorem acutioresve sonos efficient, dum tamen apertura, ubi causatur sonus, et longitudini et hypaton—is distant from [the first string] by a diatessaron; the third [string]—hypate meson—is a ditone higher [than parhypate hypaton]; the fourth [string] will proclaim mese; the fifth [string] sounds the paranete diezeugmenon or, if you prefer, the nete synemmenon, sounding a diapason plus a diapente above the first [string]. Nevertheless, this is not done out of necessity, for [the strings] can be concordantly arranged in various other ways, so that the first [string] is proslambanomenos, the second is lichanos, the third is mese, and the others are in another position; and similarly, these can be placed similarly in another position according to the player's discretion. But we prefer to arrange [it] in this manner, because this [order] is more in use now.

But on other instruments that make [their] sound by means of the breath, the width of the canes produce the highness or lowness [of the pitch] according to the proportion given above. Therefore, the canes that are double in width sound a diapason lower, and the other intermediate-sized [canes] produce the higher or lower pitches according to the greater or lesser thickness—provided that the aperture where the
Sunt et fistulae et sambucae, in quibus longitudo facit differentiam; nam [istae] saltem octo foraminibus aperiuntur, ut digitis omnia possint obturari. Nam si plura essent, aut frustra essent, quia claudi non possent inferiora, aut superiora discoperta manerent et sonum, quem non vellemus, emitterent. Quanto igitur foramina magis ad orificium accedunt, tanto sonos reddunt graviiores, et quanto ad os pulsantis magis appropinquant, tanto acutius clamant. Sed si uniuscuiusque foraminis medietas digito claudatur, semitonium facit ad totam aperturam.

Sunt et alia huiuscemodi, diversa tamen, quoniam quatuor tantum foramina cum orificio tenent et illis quatuor quemcunque cantum in acumine et gravitate comprehendunt, quod maxime mirandum est. Sed hoc fit, quia foramen idem sonum diapente et sonum diapason et utriusque et bisdiapason sub aut supra potest facere et hoc, si spiritus emittitur in duplo vel in triplo aut in quadruplo vel in trienti. sound is produced, corresponds both in length and in thickness. There are also fistulas and sambucas, in which the length makes the difference [in pitch]; for these are made accessible with at least eight holes, so that all [the holes] can be stopped with the fingers. For if there were more, they would serve no purpose, because either the lower [holes] could not be closed or the higher [holes] would remain uncovered and emit an undesirable sound. Therefore, the closer the holes approach toward the orifice—the lower the pitches they yield, and the closer they approach toward the player's mouth—the higher they sound. But if the middle of any hole is closed with the finger, it produces a semitone for the entire aperture.

There are also other [instruments] of this kind, still diverse, because they only have four holes with an orifice, and with these four [holes] they [can] express any song in highness and lowness, which is especially wonderful! This happens when the breath is emitted in double, triple, quadruple, or one-third [proportions], because the same hole is able to produce the sound of the diapente and the diapason, as well as both [of them]
combined [i.e., the twelfth], and the bisdiapason below or above.\textsuperscript{60}

Certainly [those who] desire a full knowledge of these instruments--both of their inventors and how they gradually reached perfection--may inquire into our [Musica] speculatione or theorica, where they will discover wonderful things that are most delightful to know. If we had included these things in the small volume of this first book, they would have made [our] doctrine more difficult. Therefore, with these matters dismissed to the future, we will discuss the natural instrument as we have promised.
CAPITULUM SEPTIMUM

SEVENTH CHAPTER

COPULANDI VOCEM CUM INSTRUMENTO MODUS SUBTILIS

THE DETAILED MANNER OF JOINING THE VOICE WITH AN INSTRUMENT

Multi volentes nos hac imbuere doctrina ea, quae sunt praeponenda, postponunt et e contra ita quod, quando aliquid futurum ex dictis probare voluerint et se de illo locis debitis mentionemnullam fecisse perpendunt, alibi, ubi minus quadrat, illud interserunt. Inde ergo [illa] doctrina ὅλη sive materia informis vel chaos dicitur, confusio. Nos autem non sic procedendum putamus, sed, quemadmodum ex uno in aliud facilius quis duci potest, nos intelligentiae servientes ordine disciplinae convenientissimo ista digessimus. Unde viso sub mediocri cognitione, quod arte factum est, instrumento volumus naturale per istud elevatione ordinata et depositione limatius erudire.

Many [people], wishing to instruct us in this doctrine, postpone that which should be placed first, and vice-versa. Thus, when they attempt to examine some aspect in the future according to what has been said, and they consider that they have made no mention of it in the proper places, they insert it somewhere else where it is less properly arranged. Therefore, from that time forth, that doctrine is called ὅλη, or "formless matter," "confusion," or "chaos." However, we do not think we should proceed in this manner, for just as anyone can too easily be led from one [topic] to another, we of discernment—complying with the methodical order of teaching—have arranged this [doctrine] with the greatest harmony. Whence, having become acquainted with the artificial instrument in a brief fashion, by means of this [doctrine] we wish to teach the orderly elevation and lowering of the natural [instrument] in a more refined manner.
Idcirco monemus, ut teneat discens a nobis factum ante se monochordum percutiensque chordam vocem emittat illi unisonam. Deinde digito superposito in secunda littera scilicet b comprimens chordam cum ligno percutiensque desuper chordam sonic qualitatem notet; deinde ipse vocem emittat chordae sono unisonam et aequalem. Et sic seriatim per alias litteras ascendens usque ad mesen vocem emittat ac eodem modo remittat. Sic enim ab unaquaque littera ad eius octavam facere poterit.

Sed quoniam oportet addiscentem credere, volumus erudiendos quibusdam legibus coarctare ita, quod non a quavis littera [sed] a littera c usque ad alium c inchoare praecipimus; nec tangent primum b sed secundum f, quod tono distat ab a tam in ascensu quam in descensu. Sed dicet quis: quid proferam ore, verbum an sonum tantum? Dicimus, quod non refert prima nec secunda vice, utrum duorum feceris; sed solum sonos connotare ac sonorum distantias opertet, quae in octo vocibus diapason continentibus includuntur.

Therefore, we advise the one who is learning to hold before himself the monochord that we have made, and striking the string, let him emit a sound in unison with that [string]. Then, with the finger placed above [the string] on the second letter--namely b--let him notice the quality of the sound while flattening the string with the wood and striking the string from above. Then, let the teacher emit a sound that is unison and equal to the sound of the string. And thus, ascending through the other letters in succession, let him emit the sound up to mese and also return by the same method. For he will be able to perform in this manner from any letter up to its octave.

And since it is necessary for the student to have trust, we wish to confine the students to certain rules in such a way that we advise [them] to begin not from just any letter but rather, from the letter c up to the other c. [We also suggest] that they do not play the first b but the second f--which is distant from a by a tone--in ascension as well as in descension. But someone will say: "What shall I utter--a word or only a sound?" We say that it does not matter whether you have performed one or the other on the first or
Sed postea, ut memoria sonorum recordetur, unusquisque nomine proferatur diverso, quod fuit antiquis in morem, ut Oddo Enchiriadis dicebat: noe noananne caneagis, quae nihil sunt significantia.

Alli vero tu, pro, de, nos, tri, te, ad, quae significabant modorum sedes, de quibus in suo loco dicemus. Alii autem solum litteras alphabeti ponebant scilicet: a, b, c, d, e, f, g, ut Gregorius, Augustinus, Ambrosius et Bernardus; Guido vero ut, re, mi, fa, sol, la, sicut ante diximus. Quamquam illud ex accidenti fecerit, quoniam etiam litteris omnia exempla sua demonstrat, sequaces vero post ita his vocibus adhaerent, ut omnino illas putent esse musicae necessarias, quod deridendum est.

Nos igitur, qui circa huius artis veritatem inquirendam lucubrando atque vigilando diu laboravimus, dictiones singulis chordis imponimus

second time; it is only necessary to note the sounds and the distances of the sounds, which are included in the eight notes of the diapason. But afterwards, so that the record of the sounds may be remembered, let each one be uttered with a distinct name. This was the ancient custom, just as in the Enchiriadis Oddo said noe noananne caneagis, which [actually] have no significance at all.63

But some people, whom we will discuss at their proper time, use tu, pro, de, nos, tri, te, [and] ad, which signified the seats of the modes.64 However, others such as Gregory, Augustine, Ambrose, and Bernard, set down only the letters of the alphabet—namely a, b, c, d, e, f, g. But Guido [set down] ut, re, mi, fa, sol, la, as we have said before. Although he may have done that by accident --since he also demonstrates all his examples by letters--truly, [his] followers afterwards adhere to these syllables in such a manner that they believe them to be entire-ly necessary to music, which is ridiculous!65

We therefore, who have labored for a long time--working by night and losing a great deal of sleep for the purpose of inquiring about the truth
novas et effectus totius
denotantes concentus ita,
psal, in sequenti li, in
tertia tur, in quarta per,
in quinta vo, in sexta
ces, in septima is et in
octava tas; et sic erit
conclusio syllabarum:
psallitur per voces istas,
quoniam octo vocibus fit
totus concentus. Locamus
autem eas a littera c
gravi in litteram c
acutam, quoniam perfecte
canere docent.

Ideo a littera c sunt
incipiendae, quia cantus
ab eadem littera incoat
et semitonium duorum
tonorum clauditur
intercapedine et secundum
inter duas semitonia
sonat. Primum igitur est
e f idest tur per. Sed
quia secundum semitonium
quandoque fit a littera a
in b, quandoque a littera
in c acutam propter
tetrachordum synemmenon et
diezeugmenon, quia sunt
ibi tria semitonia divisim
locata, tria illa loca
littera s sunt denotata,
hoc est: ces, is, tas.
His etenim vocibus cum
chordis instrumenti
[aequisonantibus] facile
poterimus naturale
instrumentum cum eo, quod
arte factum est,
concordare.

of this art—are assigning
new names to the
individual strings and
designating the execution
of the entire concentus in
such a manner, so that the
lowest [note] is named
psal, the second li, the
third tur, the fourth per,
the fifth vo, the sixth
ces, the seventh is, and
the eighth [note] tas.
Thus, the conclusion of
the syllables will be:
psallitur per voces
istas, since the entire
concentus is created from
theses] eight voices.
Therefore, we place these
[syllables] from the low
letter c to the high
letter c, since they teach
one to sing perfectly.

Therefore, they should
begin on the letter c,
because the production of
melodious sound begins
from the same letter and
the first semitone is
surrounded by an interval
of two tones while the
second [semitone] resounds
between two semitones.
Therefore, the first
[semitone] is from
e-f—that is, tur-per.
However, since the second
semitone occurs at times
from a to b and at other
times from the letter
high c—to account of the
synemmenon and
diezeugmenon tetrachord—
there are three semitones
placed there separately. Those three places are
denoted by the letter s—that is, ces, is, tas.
For with these voices
sounding equally with the
Quod si supra diapason scandere volumus, in eodem sono psal, ut prius, locabimus. Manebit autem bisyllabum c scilicet taspal et sequitur cum d li et cum e tur et reliqua sicut prius. Sic et in gravi faciendum est, quoniam, ut saepe diximus, post diapason renascitur vox; et quotiens ultra diapason transcendimus vel descendimus, totiens vocem renovamus. De his igitur octo tantum doctrina est recta.

And if we wish to ascend above the diapason, we will place psal on the same sounds as before. Moreover, c will remain a bi-syllable, namely taspal, and it continues with d-li and e-tur, and the rest [of them] just as before. Likewise, it should also be done this way in the low [range], since as we have often said: the sound is reborn after the diapason, [for] as often as we ascend or descend beyond the diapason, so we repeat the sound. Therefore, the doctrine is correct only in regard to these eight [notes].

Consequently, when the singer has gradually arrived at the eighth string, let him relax the voice, gradually [descending] with the same steps and syllables in reverse order; and let him do this for such a time until he has learned to do it without striking the monochord at the same time. When this has been accomplished, let him ascend again from the first [note] to the second [note] and then let him sing from the first [note] to the third [note] by step, and then after that, by leap; and let him descend from the third
immediate in elevatione et depositione se habeat.

Sed quemadmodum se habuit a prima usque ad quintam in elevatione et depositione, sic a secunda ad sextam, a tertia ad septimam et a quarta ad octavam iubilare procuret. In hoc autem exercitio semper in quinta voce praecipimus pedem esse figendum et hoc multis de causis, quae dicentur in tropis. Similiter et quando in principio usque ad octavam conscendit, quiescat in quinta voce et iterum in eodem sono incipiens ad octavam pertingat ita, ut dicit: psal li tur per vo, et post, intervallo quietis facto, dicit: vo ces is tas; sed in remittendo tas is ces vo, postmodum voce dimissa cum intervallo dicit: vo per tur li psal. Deinde a prima ad eius octavam vocem intendat, scilicet psal tas et econtra remittat tas psal.

[Note] to the first [note] by step, and then later by leap. [And let him proceed] in this manner from the first [note] to the fourth [note] by step and then later by leap— in ascending as much as in descending—and also let him continue in the same way, ascending and descending from the first [note] to the fifth [note] by step and then by leap.

And just as he has continued from the first [note] up to the fifth— in ascension and descension— thus let him attend to singing from the second to the sixth, from the third to the seventh, and from the fourth to the eighth. Moreover, in this exercise we prescribe that the [metrical] foot should always be fixed on the fifth note, and [we say] this for many reasons which will be discussed [in the section] on the tropes.72 And similarly, when [the singer] ascends from the first [note] up to the octave, let him rest on the fifth, and again beginning on the same sound—[that is, the fifth note]—let him reach the octave in this manner so that he may say: psal-li-tur-per-vo and later, after he has made a pause of a rest, he may say: vo-ces-is-tas; however, [let him say] tas-is-ces-vo when descending and later, after a rest, [let him continue to descend] saying vo-per-tur-li-
Then, let him stretch the voice from the first [note] to its octave—namely psal-tas and let him relax the opposite way [with] tas-psal.

In his et in aliis tantum exercitium sibi quisque assumat, quantum ad prompte expeditque cantandum viderit esse necessarium. Sed ne impediatur soni pronuntiatio multitutine litterarum in una syllaba, [volumus, ut] cantantes removeant litteras, quae sequuntur post vocalem, si nocumentum fecerint; at etiam p, quae praecedit s, semper removeatur, quoniam hic non orthographiam sed musicam docemus.

Dubitare tamen aliquis posset nec immerito, qua de causa octo diversas ponimus, cum tantum septem sint differentes et a nobis sic traditum et concessum fuisset meminerit. Dicendum est, quod, licet maximam fore conformitatem et similitudinem inter primam et octavam asseruerimus, in acutum tamen et gravitate eas differre numquam negavimus. Igitur [18] et differentiam inter eas et similitudinem demonstravimus. Cum eandem litteram vocalem scilicet a posuimus, similitudinem et conformitatem ostendimus; sed litteris aliis, hoc nevertheless, someone may doubt—and not without reason—why we establish eight different [syllables], since there are only seven different [notes]; and will remember that it was submitted and taught by us in this way. It is necessary to say that although we have claimed the greatest conformity and similarity between the first [voice] and the eighth [voice], nevertheless, we have never denied them to differ in [regard to their] highness and lowness. Therefore, we have demonstrated both the difference and the similarity between them.
est $s$ in principio aut $t$, differentiam acuminis et gravitatis patefecimus cognita eorum differentia, quoniam grave est, cum ex profundo pectoris attrahit spiritus, acutum vero, cum ex oris superficie sonus emittitur. Quanto magis circa pulmonem profundior fit pronuntiatio, tanto sonat gravius, et quanto appropinquiori dentibus loco venit, tanto sonat acutius. Sic ergo $t$ littera iuncta cum $a$ ex contactu linguae et clausura dentium fieri cognoscimus. Sed $s$ iuncta cum $a$ ex applicatione linguae ad palatum proferri non dubitamus. Manifestum igitur est ex dictis magis grave esse quam $tas$. Quodsi gravitatis et acuminis differentiam in prolatione $l$ et $s$ in fine syllabae positarum perpendamus, convenientissime a nobis talem locutionem factam constabat. Liquida enim littera $l$ naturaliter gravem somum emittit, spissitudo autem litterae $s$ quasi sibilans in acumen ascendit. Sibilo enim nulla vox [acutior est].

We have shown similarity and conformity when we have set down the same vowel letter—namely $a$ [for $psal$ and $tas$]; however, with the other letters at the beginning [of the syllable]—that is $s$ or $t$—we have revealed the difference of [their] highness and lowness, having recognized their dissimilarity. For when the breath is drawn from the depth of the chest [the sound] is low, but when it is emitted from the surface of the mouth [the sound] is high. The deeper the pronunciation is made in the region around the lung, the lower it sounds; the closer it comes to the mouth cavity, the higher it sounds. Therefore, in this way we know that the letter $t$ united with [the letter] $a$ is produced by the contact of the tongue and the closure of the teeth. And we do not doubt that [the letter] $s$ united with [the letter] $a$ is produced by the application of the tongue to the palette. Therefore, it is clear from what has been said that $[p]sal$ is lower than $tas$. And if we consider the difference of highness and lowness in the pronunciation of [the letter] $l$ and [the letter] $s$ [which is] placed at the end of the syllable, it will be agreed that such a discussion was most suitably made by us. For the liquid letter $l$ naturally emits a low
sound; however, the density of the letter s rises into the high range as if [it were] whistling. And no voice is higher than whistling.
CAPITULUM OCTAVUM

Si autem de numero arguatur, quia non tanti valoris octonarius noster videtur, quanti septenarius est, quo volvitur mundus et orbis, qua de causa Gregorius tantum septem litteras posuit, et cum non sit tantae perfectionis quantae senarius, cuius gratia Guido ad sex voces reduxit, cum ergo senarius et septenarius perfectiores sint octonario et cum per illos fieri possit idem, quod per octonarium nos facimus, rectius sensisse videbuntur illi, quorum quidam septenarium, quidam senarium secuti sunt, quam nos, qui sequimur octonarium.

Dicendum numerum octonarium magnam in musica perfectionem et dignitatem obtinere et non frustra esse sed necessario positum. Primo probatur eius perfectio per comparationem. Sicut enim quidam septenarii perfectionem propterea, quod septem sunt, quam ratione octonarii probamus perfectionem, quod septem planetae, nos eadem ratione octonarii probamus perfectionem, quod septem.

EIGHTH CHAPTER

Now with respect to the number: it may be argued that our number eight does not seem of as much value as the number seven, by which the world and the universe are turned.75 [It was] for this [very] reason that Gregory only set down seven letters. And [the number eight] is not as perfect as the number six, for the sake of which Guido reduced the voices to six.76 Therefore, since the number six and the number seven are more perfect than the number eight, and since the same thing can be done through those [numbers] that we ourselves have done by means of the number eight, those who have followed the number seven [or] the number six will seem to have perceived [these things] more correctly than [those of] us who pursue the number eight.

[However], it should be said that the number eight possesses great perfection and value in music, and it is not established in vain but rather, by necessity. In the first place, its perfection is proven by means of a comparison. For just as some [affirm] the perfection of the number seven on this account--because there are seven planets--we prove
planetis addito firmamento octonarius numerus resultat. Et in illorum comparatione gravius peccatur, quia quod excellentius est, scilicet octava [sphaera], dimitititur. Nam dato silentio sicut Terra cum elementis prima et gravior est sphaera Lunae, secunda Mercurii, tertia Veneris, quarta Solis, quinta Martis, sexta Iovis, septima Saturni, octava coeli stellati. Quam comparisonem etiam Marcus [19] Tullius facit in sexto libro, quem De re publica composuit, aliis quidem verbis, sed in [hac] tamen sententia. Et hoc quantum ad septenarium. Quantum vero ad senarium, quia mathematicae sunt rationes, dicemus mathematica corpora subiicienda esse cogitationi et non sensui. In quibus principium est punctus, qui longitudinem nec latitudinem habet nec profunditatem aut altitudinem. Hic protractus efficit lineam, quae unius dimensionis est scilicet longitudinis sine latitudine et profunditate et duobus punctis ex utraque parte longitudinem the perfection of the number eight by the same reason, because [when] the firmament is added to the seven planets, it results in the number eight. And they err more seriously in their comparison, because they dismiss that which is more excellent—that is, the eighth sphere. For with the given silence—such as the Earth with [its] elements— the first and lowest [sound] is the sphere of the Moon, the second is that of Mercury, the third is that of Venus, the fourth is the that of Sun, the fifth is that of Mars, the sixth is that of Jupiter, the seventh is that of Saturn, [and] the eighth is that of the starry sky. Marcus Tullius also made such a comparison in the sixth book of De re publica; certainly [it is stated] with different words but nevertheless, the thought is the same. But indeed, in regard to the number six we will say, for mathematical reasons, that the mathematical bodies should be subject to reason rather than the senses. The first of these [mathematical bodies] is the point—which has neither longitude nor latitude, neither depth nor height. [When] this [point] is dragged, a line of only one dimension is produced—that is, [a line that] has longitude without latitude and
terminantibus continetur. Hanc lineam si geminaveris, alterum corpus mathematicum fiet, quod duabus dimensionibus extenditur, in longum scilicet et latum carens altitudine, quod superficies dicitur; et hoc punctis quatuor continetur datis scilicet cuilibet duarum linearum duobus punctis. Si vero hae duae lineae fuerint duplicatae, ut si subiectis duabus duae aliae superponantur, adicietur profunditas et sic solidum corpus efficitur, quod sine dubio octo angulis continetur. Et hoc videre possumus in taxillo seu tessera, quae et cubus graeco nomine vocatur.

His rationibus geometricis adiungantur naturae numerorum. Nam monas punctus putatur, quia, sicut punctus corpus non est, sed ex se facit corpus, ita monas numeras esse non dicitur sed numerorum origo. Primus ergo numerus binarius est, qui similis est lineae de puncto sub gemina punctorum terminacione protractae. Hic numerus idest binarius duplicatus de se quatuor facit; quaternarius quoque geminatus octonarium reddit, qui numerus solidum corpus imitatur. depth; and it is contained by the two points terminating the longitude from both directions. If you duplicate this line, another mathematical body will be made that is extended into two dimensions—that is, into longitude and latitude. [But it will be] lacking height, which is called "surface"; and this is contained within four given points—that is, [within] any [mathematical body] of two lines with two points. But if these two lines are duplicated—as if two other [lines] are superimposed upon the two lower [lines]—depth will be added, and thus a solid body is produced that, without doubt, is contained within eight angles. And we can see this in a die or a cube of wood, which is also called by the Greek name cubus.

To these geometrical principles, let the natures of the numbers be added. For the point is considered [as] monas, because just as the point is not a body but produces a body from itself, thus monas cannot be called a number but rather, [it is called] the origin of the numbers. Accordingly, the first number is binary, which is similar to a line drawn from a point below the duplicated limit of the points. This number—that is, two—duplicated, produces [the number] four; and the number four
Diximus enim duas lineas duabus lineis superpositas octo angulorum dimensione integram corporis soliditatem creare. Et hoc est, quod apud geometros dicitur bis bina bis corpus solidum esse, quod Macrobius commemorat in [libro] De somnio Scipionis alii quidem verbis, eandem tamen sententiam continentibus. Et concludit: a pari ergo numero accessio usque ad octo soliditas est corporis, et pros sequitur: ideo inter principia huic numero plenitudinem deputant. Concludimus ergo nos, quod qui octo voces truncat aut minuit a musica nostra, perfectionem atque plenitudinem aufert ab ea. Non ergo numerus octavus imperfectus est, sed in musica plenus atque perfectus, quoniam totum continens est et totus concentus, ut saepe dictum est, octo vocibus includitur. Non ergo frustra, immo necessario utimur octonario; et de his haec tenus. Nunc ad vocem figuris in plano repraesentandam festinamus.

duplicated, renders the number eight [which] represents a solid body.
For we have said that two lines superimposed upon two lines create the entire solidity of the body with a dimension of eight angles. And it is this—twice two times two—which is called a "solid body" among geometricians.
Macrobius mentions this in [his] book, De somnio Scipionis; indeed, it contains the same thought even though [he uses] other words. For he concludes: "Therefore, the solidity of the body is an increase from an equal number up to [the number] eight." And [later] he continues: "For that reason, among [their] principles they attribute fullness to this number." Thus, we conclude that whoever truncates or diminishes the eight notes from our music, takes perfection and fullness away from it. Therefore, in music, the number eight is not imperfect; rather, it is full and perfect, since it contains everything, and as it has often been said: "All harmony is included within [these] eight notes." Accordingly, we do not use the number eight in vain, no, indeed we use [it] out of necessity. But enough of these things! Now we hasten to graphically represent sound by means of the figures.
TRACTATUS SECUNDUS
CAPITULUM PRIMUM

IN QUO OSTENDITUR, IN WHICH IT IS SHOWN HOW
QUALITER ET QUOMODO VOX THE SOUND SHOULD BE
IN PLANO DEBEAT FIGURARI FIGURED GRAPHICALLY

Etiam nunc voces musicae [20] Now let us distinguish
distinguamus. Vox est the musical sounds. Sound
aeris repercussio is the uninterrupted
indissoluta usque ad repercussion of air
auditum perveniens. reaching the ear. The
Humana vox duplex est: human voice is twofold:
quaedam continua, quaedam one [type] is continuous,
quae vero discreta. Continuae but the other [type] is
voces sunt, quando communi separated.
fine iunguntur, ut, si Sounds are
quis nervum percutiat et continuous when they are
percutiendo torqueat, united for a common
eveniet, ut in principio purpose, so that if anyone
gravius sonet et continuo should strike a string and
magis acuatur; et ita twist it while striking
continui fient vocis it, it will happen that it
gravis et acutae sonitus, will sound lower in the
sicut etiam in gemitu beginning and continously
accidunt infirmorum. Idem be raised higher. Thus,
etiam quibusdam legentibus the sounds of the low and
contingit, qui vocem the high voice will become
legendo continuantes continuous, just as it
sensim ascendunt also occurs in the
descenduntve. De talibus groaning of the sick. The
tu autem, ut verbis Boetii same thing also happens to
loquar, nolumus nos certain readers who
tractare, quoniam ab gradually raise or lower
harmoniae scientia [their] voice during
separantur. Discretae continuous reading. But
vero voces proprios habent concerning such sounds,
locos. Igitur et soni let me speak in the words
instrumentorum discreti et of Boethius: "We do not
voces harmonicae want to examine such
subiciuntur arti.

246

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Alio etiam modo
distinguit Boetius in
libro primo vocem humanam
in continuam et discretam.
Dicit enim continuam esse,
qua loquentes vel prosam
orationem legentes verba
[percurrimus]. Festinat
enim tunc vox non
inhaerere in acutis aut in
gravibus sonis, sed quam
velocissime verba
percurrere, expediendisque
sensibus expressendisque
sermonibus [continuæ]
vocis impetus operatur.
Discretam vero illam
dicit, quam canendo
suspendimus, in qua non
sermonibus sed modulis
potius inservimus, estque
vox ipsa tardior et per
modulandas varietates
quoddam faciens
intervallum, non
taciturnitatis aut
silentii, sed tardae
potius ac suspensae
cantilenæ. His, ut
Albinus autumat, additur
tertia differentia, quae
medias voces possit
includere, cum scilicet
heroum poemata legimus,
quae neque continuo cursu,
ut prosam, neque suspenso
segniorique tractu vocis,
ut canticum, pronuntiamus.
Similiter, cum in eccelsia
orationes, capitula,
lectiones et his similia
legimus, de quibus in
tractatu de tropis
manifestius apparebit.

Still, in [his] first
book, Boethius divided the
human voice into
continuous and separated
by another method. For
he says that it is
continuous "by which we
execute words [when]
speaking or reading prose.
For then the voice
hastens, not to remain on
the high or the low sounds
but to execute the words
as quickly as possible;
and the attack of the
continuing voice is busy
releasing the emotions and
the expressing [the
thoughts] of the
discourse." But he calls
"separated" that which we
lift up in singing—which
we do not attend to in
discourses but rather, in
melodies. And the sound
itself is slower, making a
certain interval—not of
quietness or of silence
but rather, of slow and
sustained song—through
the diversities of melody
making. To these—as
Albinus asserts—a third
difference is added, which
may include the
intermediate voices such
as when we read heroic
poems, which we recite
neither with a continuous
course, as [in] prose, nor
with a sustained and
slower flow of the voice,
as [in] the canticle.
Similarly, [it is also
used] when we read
prayers, chapters [of
scripture], readings, and
Vox igitur, cum sit de genere successivorum, dum fit, est; sed cum facta est, non est. Ideo oportet eam regulis ac figuris imaginationi repraesentare. Figura enim vocis [similiter] fieri non potest, praesertim in plano depicta, quoniam, cum profertur, non causatur ad modum puncti fluentis lineam constituentis in longum tantum aut in longum et latum ut linea et superficies, sed in orbem et in sphaeram diffunditur sic, ut per sex positionis differentias ab auribus audiatur, hoc est: sursum, deorsum, ante, retro, dextrorsum et sinistrorsum. Boetius enim vocem per lapidem in stantem aquam proiectum repraesentare conatur undis iactu lapidis excitatis in orbem profugientibus, ut intelligatur sic aerem a voce sicut aquas a lapide propelli.

Therefore, sound, since it concerns a kind of succession, exists while it is being made, but does not exist after it is made. On that account, it is proper to represent it with straight lines and figures of the imagination. For a figure resembling a sound cannot be made; particularly it cannot be depicted graphically, since when it is produced it does not cause the construction of a line in only length, [as] in the manner of a flowing point, or in length and width, as a line and [its] surface, but it is extended into a circle and into a sphere in such a manner that it may be heard by the ears through six different positions—that is: upwards, downwards, forwards, backwards, towards the right, and towards the left. For Boethius attempts to represent sound by means of a stone thrown into stagnant water with the rippled waves of the thrown stone escaping into a circle, so that thus it may be understood that the air is placed in motion by the voice, just as the water is placed in motion by the stone.84
Vox igitur in plano non figuratur, sed vocis elevatio sive intensio et depressio sive remissio quodam modo repraesentatur. Sicut enim in geometrica demonstratione linea picta, quae loco lineae geometricae ponitur, non caret latitudine, qua geometrica linea carere intelligitur, sic in musica nostra elevationem ipsam sive depressionem, quae in puncto consistunt indivisibili, intervallis quibusdam notularum sensibilibus ostendimus.

Cum igitur notulam sequentem super primam inspexerimus, a gravitate inchoantes in acumen vocem elevare docemur. At si secunda inferior fuerit, ab acuto in gravem deveniemus. Et iste modus in omnibus notulis totius cantus subsequentibus est observandus. Sed quoniam elevatio notulae sive depressio, quanta in voce tenenda sit, non est facile cognitu, contemporanei nostri optimum in hoc modum excogitaverunt. Decraverunt enim, ut lineae quatuor extendantur aut quinque et a linea in spatio et a spatio in linea tali sit processus, qualis in arte facto instrumento. Voces

Therefore, sound is not represented graphically but [rather], the elevation or, if you prefer, the stretching of the pitch and the lowering or, if you prefer, the relaxing of the pitch is represented in a certain manner. For just as in a geometrical representation, a drawn line—which is established in place of the geometrical line—is not lacking the width that a geometrical line is understood to be lacking; thus, in our music we show either the elevation itself or the lowering, which occurs on an indivisible point with certain perceptible intervals of the notes.

Therefore, after we have examined the following note that is higher than the first [note], we are taught to raise [the sound], beginning from the low and proceeding to the high sound. But if the second [note] is lower, we will arrive at the lower [sound] from the higher [sound]. And this method should be observed on all the subsequent notes of the entire song. But since, with the raising or lowering of the note, it is not easily perceived how much [the sound] should be controlled with the voice, our contemporaries have invented an excellent method in regard to this matter. For they have
continuo se invicem subseguuntur et sibi invicem succedunt. Et ut cognoscantur loca illius distincta propter intervallorum differentiam et intercapedinum inaequalitatem, signatur una illarum linearum hoc $C$ signo vel isto $E$, quorum primum $f$ grave, secundum vero $c$ acutum demonstrat. Et haec signa neoterici claves appellare solent, quoniam loca manifeste demonstrant.

Therefore, we will arrange five lines with the first sign—that is, $f$—having been marked on the middle one of [those lines]; $c$—which we have called $sal$—will fall upon the space situated between the lowest line and the following [line]; $d$—which we have named $li$—[will be placed] on the second line; and $e$—which we have named $tur$—[will be placed] on the space situated below the marked line. 

Disponemus igitur lineas quinque: cum primo signo media illarum signata, quod est $f$, cadet $c$, quod $sal$ diximus, in spatio a linea inferiori et sequenti contento et in linea [secunda] $d$, quod $li$ appellavimus, et in spatio sub linea signata contento $e$, quod $tur$ nuncupavimus. In hac igitur linea ponitur per et in spatio super ipsa contento, quod est $g$, vo; et sequitur eodem modo de reliquis scilicet: $ces$, $is$, $tas$ ita, quod $tas$ in linea cadet altiori, quod est determined that four or five lines may be extended, and such is the procedure from the line to the space and from the space to the line, as on the artificial instrument. The notes continuously follow one after another, and [those notes] follow after each other in turn. And in order that its distinct positions may be recognized according to the difference of the intervals and the inequality of the interruptions, one of these lines is marked with this sign $C$, or with this sign $E$. The first of these [signs] indicates $f$ grave, but the second [sign] indicates $c$ acutae. And the moderns are accustomed to calling these signs "clefs," since they clearly show the positions.
aliud c, ubi est alia clavis collocata. At si volumus cum hac idem facere in altiori posita, idem eveniet. Sed si clavis ista non in altiori sed in subsequenti ponatur, sub linea prima sal ponemus. Et sic tas in linea cadet signata, quod etiam cum prima fiet, si in linea quarta a superiori ponatur, ita quod nec lineae nec spatia inter lineas contenta semper eandem tenebunt vocem. Sed secundum quod clavis magis vel minus elevabitud, graviora seu acutiora loca tenebunt. Signabimus igitur nunc duplicem diapason, unam a littera [C] in c acutam et aliam ab eadem in § superacutam, ut inchoantes per diversa loca connotent voces.

Si autem lector non ita facile per notulas potest discurrere cum vociis elevatione seu depressione, ad monochordum recurrat et a and vo--which is g--[is] on the space situated above it. Likewise, it follows with the rest--that is, ces, is, tas--in such a manner that tas will fall on the highest line--that is, [upon] the other c where the other clef was placed. But if we wish to do the same with this [c clef] positioned upon the highest [line], the result will be the same. But if this [c] clef is not placed upon the highest [line] but [rather], on the line below, we will place sal below the first line. And thus tas will fall on the marked line [c], which will also occur with the first [clef, f], if it is placed on the fourth line from the top. For neither the lines nor the spaces contained between the lines will always have the same sound, but they will have lower or higher positions according to how [much] the clef is raised, more or less. Therefore, we will now mark the double diapason, [for there is] a [diapason] from the letter C to c acutae and another from [c acutae] to § superacutae, so that they denote the sounds that begin with the different positions.

However, if the reader cannot pass through the notes easily, with the raising or lowering of the sound in this manner, he may return to the
tertia voce incipiens
usque ad eius octavam
conscendat et ad tertiam
vocem [descendat], ut
dictum fuit capitulo
[septimo tractatus primi].
Multi volentes totum
igitur, quod dictum fuit,
debere fieri cum
instrumento in
hoc sine eo facere
[scient] notulis
inspectis.

monochord; and beginning
from the third note he may
ascend up to its octave,
and [then he may] descend
to the third note, as it
has been discussed in the
[seventh] chapter [of the
first treatise].
Therefore, everything that
has been said [in the
section which begins]
"Multi volentes . . ."
should be done in this way
with the instrument
[until] they know how to
make [the sounds]
without [the monochord]--
[that is, simply] by
looking [at] the notes
[themselves].

Figure 24. [P]sallitur per voces istas, Musica practica, 22.
Source: Johannes Wolf, ed., Musica practica, 27.
CAPITULUM SECUNDUM

FICTAE MUSICAEP DECLARATIO

Ut autem de his signis atque notulis plenior habeatur cognitio, aliqua circa hoc subtilius investigabimus. Solent enim alia signa in cantibus ponib, per quae distantia intercapedumin cognoscitur inaequalis. Quorum alterum sic b rotundo scribitur, alterum vero sic 4 quadratum figuratur. Primum signum b molle dicitur sive 4 rotundum, secundum vero 4 quadraturn sive 4 durum; 4 quadratum et a rotundum appellantur a figurae qualitate, sed b molle aut 4 durum dicitur ex eo, quod canentes per litteras Gregorii, quando ab a in b faciunt semitonium, illud b dicunt molle, quia, cum in arsim et thesim saltus fit per semitonium, magis mollescit vox illa quam quando per tonum, sicut a b molle, a 4 quadratum durum. Sic etiam quando per semiditonum magis molle quam per ditonum, sicut g b molle, g 4 quadratum durum. Similiter diatessaron magis molle quam tritonus, sicut f 4 molle, f 4 quadratum durissimum.

SECOND CHAPTER

AN EXPLANATION OF MUSICA FICTA

In order that one may have a fuller understanding of these signs and notes, we will investigate some [of these] things in greater detail. For in songs it is customary for other signs to be established, through which the variable distance of the intervals is known. One of these is written as a round b, but the other is represented with a square 4. The first sign is called soft b or, if you prefer, round b; however, the second [sign is called] either square 4 or hard 4. [And] they are called square 4 and round b due to the quality of the figure. But it is called soft b or hard 4 due to the fact that the singers, who sing according to the letters of Gregory, call it soft b whenever they make a semitone from a to b(b), because when a leap of a semitone is made in arsis or thesis, that note is made softer than when [a leap] of a tone [is made], as for example: a to soft b [compared to] a to hard square 4. Thus, even when [a leap] of a semiditone [is made], [it is] softer than [a leap] of a ditone, as for example: g to soft b.
Ex his patet error quorundam cantorum, qui dicunt $b$ molle aut $f$ quadratum. Duobus enim modis errant: primo, quia ipsi cantant per syllabam Guidonis et non per litteras Gregorii, neque igitur $b$ molle neque $f$ quadrum durum pronuntiant, sed $fa$ aut $mi$. Secundo non faciunt rectam relationem; nam quando dicunt $b$ quadratum, debent correspondenter dicere $b$ rotundum, et quando dicunt $f$ quadratum, debent dicere $f$ durum et sic relatio recta fiet. Et hoc fuit antiquis in morem per Gregorii litteras cantantibus, quibus propria sunt vocabula sicut Graecis propria synemmenon aut diezeugmenon. Per nostras autem dictiones canentibus propria erunt nomina $b$ $is$ in coniuncto et $is$ $i$ in disiuncto. Omnibus vero communia tonum aut semitonium facere sunt vocabula. Sed alibi non solum in paramese signant istis signis tonos aut semitonia cantores. Dicunt namque: ubicunque $fa$ sine $mi$ reperitur, ibi mi faciendum est, sicut in $b$ $fa$ $f$ $mi$. Idem quoque, ubi $mi$ sine $fa$, quod appellant multi fictam musicam, quorum Philippetus

[compared to] $g$ to hard square $f$. Similarly, the diatessaron is softer than the tritone, as for example: $f$ to soft $b$
[compared to] $f$ to hardest square $f$. 88

The error of certain singers, who say soft $b$ or square $f$, is revealed from these things. For they err in two ways: (1) because they themselves sing according to the syllables of Guido rather than according to the letters of Gregory, and therefore, they proclaim neither soft $b$ nor hard square $f$ but [rather], $fa$ and $mi$; (2) [because] they do not make a correct proposition, for they should say round $b$ whenever they say square $f$, and correspondently they should say hard $f$ whenever they say soft $b$, and thus [their] proposition will be correct. And this was the custom of the ancients, singing according to the letters of Gregory, for whom there are special terms, just as for the Greeks the special [terms] are synemmenon or diezeugmenon. However, by means of our syllables, the special terms for the singers will be $b$ $is$ in the conjunct [tetrachord] and is $i$ in the disjunct [tetrachord]. Indeed, [these] are common terms to everyone producing a tone or a semitone. With these signs the singers signal tones or semitones,
temerarie loquens sic ait: una est ficta musica. Philipetus dicit. Verum tamen ignoravit, quod saltem modis deberet fieri duobus. Facere enim ex mi fa diversus est modus ab illo, qui facit ex fa mi, ut paulo post dicetur, ex eo, quod non voces correspondent eo modo, quo naturaliter sunt collocatae. Quando igitur ex mi fa est faciendum, tali signo perscribunt scilicet b rotundo; sed quando ex fa mi, hoc signo notant scilicet † quadro vel hoc ☐.

Locabitur igitur istud † molle in quinque locis secundum eos, scilicet in b mi et in e la mi, in a la mi re primo, in e la mi acuto et in a la mi re secundo. In his quidem locis dicemus fa per semitonium a loco proprio depressum, sed istud † vel istud ☐ in c fa ut, in f fa ut, in c sol fa ut, in f fa ut acuto et in c sol not only on paramese, but on other places as well. For they say: "Wherever fa is found without mi, mi should be made there, as in b fa † mi"; likewise [this also holds true] where mi [is found] without fa, which many [people] call musica ficta. Philipetus, speaking thoughtlessly, said: "Musica ficta [is made] in one way." Nevertheless, truly he ignored that it should be done in at least two ways. For a different method was [used] to make fa from mi than that which [was used] to make mi from fa, as it will be discussed a little later. This is because the notes do not correspond in the way that they were naturally arranged. Therefore, whenever fa must be made from mi they write [it] down with such a sign—that is, round b; but whenever mi should be made from fa they indicate [it] with this sign—that is, square †, or this [sign] ☐.

Therefore, according to [their method], this soft † will be arranged in five positions—that is, on b mi, on e la mi, on the first a la mi re, on e la mi acutae, and on the second a la mi re. Certainly, we will say that in these places fa was lowered by a semitone from its proper position, but [when] this [sign] †
fa, in quibus quidem locis dicemus  \textit{mi} per semitonium a loco proprio elevatum. Quod etiam appellant coniunctas propter hoc, quia sicut quando post mesen ponitur trite synemmenon, qua de causa tonus meses et parameses in duo semitonia dividendus est, ita et quilibet alius tonus alibi locatus dividii debet. Adduntque ulterioribus: quaelibet istarum coniunctarum hexachordum est sicut alia, quae prius posita sunt; et ideo sicut post \textit{f} \textit{fa ut}, in quo \textit{ut} dictum est, sequitur \textit{g sol re ut}, ubi iterum \textit{ut} collocatur propter iam dicta, sic et in unoquoque locorum. Diffiniuntque hoc modo: Coniuncta est facere de semitonio tonum et de tono semitonium, sic et de semiditono ditonum et de ditono semiditonum et de aliis speciebus similiter.

\begin{align*}
\text{Et sic bene dicunt, quia ad modum diezeugmenon et synemmenon tetrachordorum se habent ista hexachorda coniuncta. Semotus a vera cognitione Johannes Tinctoris sic ait: Coniuncta est positio} & b \\
\text{or this [sign]} & \text{[is placed] on } c \text{ fa ut, on } f \text{ fa ut, on } c \text{ sol fa ut, on } f \text{ fa ut acutae, and on } c \text{ sol fa, we will say that in these places } mi \text{ was raised by a semitone from its proper place. They also call this coniuncta, because just as when trite synemmenon is placed after mes} & e \text{--for which reason the tone [between] mes} & e \text{ and parameses must be divided into two semitones--thus also any other tone located elsewhere should be divided. And furthermore, they instruct us: "Any of these coniunctae is a hexachord, just as the others that were arranged previously," and therefore, just as after } f \text{ fa ut (on which it is called } ut), \text{ g sol re ut follows--where } ut \text{ is placed again according to [those things which have already been said; likewise also, in each one of the positions. And they define [it] in this way: "Coniuncta is [the method of] making a tone from a semitone and a semitone from a tone; thus also, making a ditone from a semiditone and a semiditone from a ditone, and similarly concerning the other species."} & \end{align*}

And thus they speak correctly, because these coniuncta hexachords behave in the same way as the diezeugmenon and synemmenon tetrachords. Johannes Tinctoris--far removed from the true
aut \( \frac{1}{2} \) in loco irregulari. Nam si signum \( b \) mollis poneretur in \( c \ sol \ fa \ ut \) vel in alio loco, ubi \( fa \) esset, irregulariter esset positum et tamen coniuncta non esset, ita si \( \frac{1}{2} \) quadratum ubi \( mi \). Quod si \( b \) ponatur in \( b \ mi \), coniuncta fit et tandem locus est irregularis ipsius \( b \), quia octava est ad \( b \) rotundum. Cum igitur in \( b \ mi \) \( fa \) ponatur, octavo loco \( a \ fa \), quod ponitur in trite synemmenon diapason resonans consonantiam, ut habebit et reliquas voces singulas singulis referendo in diapason consonantia cum aliis resonantes. Sicut igitur \( ut \) synemmenon ab \( ut \) diezeugmenon tono superatur, ita \( ut \) istius a gamaut tono suberit, quod appellatur ab ipsis retropolis, quia, cum gamaut in capite policis superpositum sit, retro ipsum in prima scilicet exteriori iunctura digiti ponitur et sequitur in gamaut \( re \), in \( a \ re \) \( mi \), in \( b \ mi \) \( fa \), sed in \( c \ fa \ ut \) \( sol \) et in \( d \ sol \ re \) \( ia \). Sic et ad \( mi \), quod ponitur in \( c \ fa \ ut \) elevandum, ut ponitur in \( a \ re \), et completur istud hexachordum in \( f \ fa \ ut \).

knowledge--states thus: "Coniuncta is the position of \( b \) or \( \frac{1}{2} \) in an irregular place." For if the soft \( b \) sign were placed on \( c \ sol \ fa \ ut \) or in another position where \( fa \) was, it would be placed irregularly, and yet it would not be coniuncta; likewise, if square \( \frac{1}{2} \) were placed where \( mi \) had been. But if \( b \) is placed on \( b \ mi \), coniuncta is made, and in the end it is an irregular place for \([b]b\), since it is an octave to round \( b \). Therefore, when \( fa \) is placed on \( b \ mi \) at the octave position from \( fa \), it will hold [the syllable] \( ut \), since it is placed on trite syn\( \text{\textgamma} \)menon, sounding the consonance of the diapason; and the several remaining notes will sound with the others--one by one--in relation to the consonance of the diapason. Therefore, just as \( ut \) syn\( \text{\textgamma} \)menon is higher than \( ut \) diezeugmenon by a tone, thus that \( ut \) will be lower than \( \Gamma \ ut \) by a tone. [And] they call this retropolis, because when \( \Gamma \ ut \) is superimposed upon the top of the thumb [the retropolis] is placed behind it--that is, on the first exterior joint of the finger; and it is followed by \( re \) on \( \Gamma \ ut \), \( mi \) on \( a \ re \), \( fa \) on \( b \ mi \), \( sol \) on \( c \ fa \ ut \), and \( la \) on \( d \ sol \ re \). Likewise also \( ut \) is placed on \( a \ re \) for the purpose of raising \( mi \)--which is placed on
Coniunctae autem, quae per semitonium vocem a loco proprio deprimit, appellantur ab ipsis coniunctae b mollis; sed quae eodem elevantur semitonio, ¦ quadrati. Ad brevem autem uniusculus cunctae cognitionem ut hoc interest, ut cognito loco coniunctae ab eodem per iuncturas retrocedamus dicentes: fa, mi, re, ut, si b mollis, aut mi, re, ut, si ¦ quadrati. Unde qui bene omnia, quae dicta sunt, inspexerit, taliter manum compositam recte conspiciet: In retropolis scilicet ut, in gamaut, ut re, in a re ut, re, mi, in b mi ut, re, mi, fa, in c fa ut vero ut, re, mi, fa, sol, in d sol re ut, re, mi, fa, sol, la, a quo usque a la mi re secundum in omnibus signis vel locis sex istas voces reperiemus. Post a la mi re solvitur; nam id quod prius incepit, prius desinit. Et ita in secundo b fa ¦ mi erunt re, mi, fa, sol, la, in c sol fa mi, fa, sol, la, in d la sol fa, sol, la et in e la sol, la, postquam ponunt aliam vocem scilicet la, quae distat per tonum ab ista, quoniam dependet ab ultima coniunctarum. Et sic erunt loci viginti duo, ideoque post coniunctarum additionem manus perfecta dicitur, quoniam tota per

And they call the coniunctae that lower a note from its proper position by a semitone soft b coniunctae, but [they call the coniunctae] that are raised by the same semitone, square ¦ coniunctae. However, for a brief notion of each one of the ut coniunctae, it is important that, having become acquainted with the position of the coniuncta, we may retrogress from the same position by means of the joints saying: fa, mi, re, ut, if [we are using] soft b, or mi, re, ut, if [we are using] square ¦. Whence, whoever will have thoroughly examined all the things which have been said will see the hand correctly arranged in this manner: namely, ut on retropolis; ut, re on Γ ut; ut, re, mi on a re; ut, re, mi, fa on b mi; ut, re, mi, fa, sol on c fa ut; [and] ut, re, mi, fa, sol, la on d sol re. From here up to the second a la mi re, we will find these notes again on all the signs or, if you prefer, in the six positions. After [the second] a la mi re, it is dissolved, for that which has begun first, ends first. And thus, there will be re, mi, fa, sol, la, on the second b fa ¦ mi; mi, fa, sol, la on c sol fa; fa, sol, la on d la sol; and sol, la on
semitonia recte divisa est. Ipsi autem dicunt perfectam, quoniam trium diapason est continentia. In ternario enim maxima perfectio denotatur, quoniam totum aequale est suis partibus quotis et aliquotis simul sumptis nec aliquis alius numerus hanc sibi dignitatem vendicat. Sed ex parte bene dicunt, in hoc scilicet, quod ternarius numerus perfectus est. Verum in hoc errant, quia manus trium diapason non est, ut paulo post ostendemus.

Ex his autem, quae dicta sunt, lectores excogitare poterunt, quomodo ex Guidonis doctrina confusio suborta est. Ipse enim consideravit, quod semper, ubicumque semitonium esset pronuntiandum, mi et fa cantores proferre deberent. Propter hoc autem crebris hexachorda in tetrachordis tam
coniunctis quam disiunctis locavit, propter quod binas voces et ternas in uno eodemque loco, ut supra monstratum est, de necessitate collocavit. Nos autem de necessitate easdem sex in locis praedictis componi ipsius habito fundamento mathematico demonstravimus. Sed de vocum in uno loco confusione de Guidonis arte proveniente satis hactenus. Deinceps autem quae ipsarum proferendae sint, quae vero reticendae, quod eius sequaces mutationes appellant, subtilius discutiamus.

hexachords on conjunct tetrachords as much as on disjunct tetrachords, on account of the fact that, out of necessity, he arranged double and triple notes on one and the same place, as it was shown above. We, on the other hand, out of necessity, have demonstrated by treating his foundation mathematically that the same six are composed in the positions mentioned. But enough already about the confusion of the notes in one position stemming from Guido's art. Now lets us discuss in greater detail which of [the voices] should be performed [and] which of them should be silenced—that which his followers call mutations.
CAPITULUM TERTIUM
[desideror]

THIRD CHAPTER
[missing]
Superest nobis tanta vocum cognita variatione, ad quid in uno loco sint colocatae, subtiliter disserere, utrum scilicet omnes simul pronuntiare aut unam alia in eodem loco dimissa debeamus accipere. Circa quod advertendum est tres illarum ascendentes dici scilicet ut, re, mi, tres vero descendentes scilicet fa, sol, la. Unde Guidonis sequaces dicunt: ut, re, mi scandunt, fa, sol, laque descendunt. Et cum cantus in altum ascendit, pro descendente voce ascendentem accipere nos percipiunt, ut, si sumus in mese cum la et cantus petit loca altiora, iuxta istorum doctrinam la dimittere et re aut mi debemus assumere et tunc cum re aut cum mi ad altiora loca facilius poterimus pervenire. Sic et cum in paranete synemmenon vel trite diezeugmenon fuerimus cum ut et cantus ad ima perlabitur, ut dimittere et sol vel fa iubent accipere, et sic cum fa vel sol cantando descendere poterimus. Et hoc est, quod ipsi mutationem appellant dicentes: mutatio est unius vocis in aliam variatio. Alii autem sic

Now that the great diversity of the notes has been examined, it remains for us to discuss in greater detail how they may be arranged in one place; namely, [we will discuss] whether we should pronounce all [the syllables] together, or take [only] one, after dismissing the other in the same position. Concerning this, it should be noticed that three of them ascending are called namely, ut, re, mi, but three descending [are called] namely, fa, sol, la. Whence, the followers of Guido say: ut, re, mi when they ascend and fa, sol, la when they descend. And when the song ascends into the high [range], they teach us to take the ascending note instead of the descending note, so that if we are on mesē with la and the song seeks higher positions, according to their doctrine we should abandon la and take re or mi, and then with re or mi we will be able to arrive more easily at the higher positions. Thus also when we will have been with ut on paranēte synēmenon or trite diezeugmenon and the song makes its way to the lower positions, they tell
diffiniunt: mutatio est
duarum vocum aequalium
inter se per diversas
proprietes in uno signo
et una voce variatio.

Permutatio autem
dupliciter fit: aut a
causa necessitatis
scansionis aut remissionis
aut causa praeponendi
postponendive semitonium.
Haec autem semper in
vocibus, quae eiusdem sunt
qualitatis, fieri
cognoscimus, hoc est ambae
ascendentes aut ambae
descendentes. Illa autem
non sic, sed ex una
ascendente et alia
descendente componitur.
Erit igitur triplex
mutatio: una totidem in
ascendendo, alia totidem
in descendendo, tertia
vero capit utrumque. Sed
quae totidem in ascendendo
fit, ea est quae de
vocibus ascendentibus
composita est, uti in g
sol re ut re ut, ut re, in
a la mi re mi re, re mi et
in suis octavis. Quae
vero totidem in
descendendo fit, ea
nimirum est, quae ex
vocibus descendentibus
constat, sicut in c sol fa
ut sol fa, fa sol, in d la
sol re la sol, sol la et

[us] to abandon ut and
take sol or fa; and thus
we will be able to descend
by singing with fa or sol.
And this is what they
themselves call mutation
saying: "Mutation is the
variation of one voice for
another." But others
give this definition:
"Mutation is the variation
of two equal notes
interchanged with one
another by means of
diverse properties on one
sign and one note."

A permutation is made in
two ways: (1) either out
of necessity for ascending
or descending; or (2) for
the purpose of placing a
semitone before or after
[a note]. And we
recognize that these
things are always done in
the notes that are of the
same quality—that is,
[with] both [notes]
ascending or both [notes]
descending. However, that
[permutation] is not done
in this way; rather, it is
made from one [note]
ascending and another
[note] descending.
Therefore, mutation will
be threefold: often one
[method occurs] while
ascending, another while
descending, and a third
[method] engages in both.
For that which is so often
done in ascending is that
which is composed of
ascending notes, as on
g sol re ut: re ut, ut
re; on a la mi re: mi re,
re mi; and on their
octaves. And that which
is so often done in
in suis octavis. Itaque semper fit inter voces per tonum secundum ordinem distantes. Secundum ordinem dico, quia, ut supra dictum fuit, sicut ut a re distat per tonum, sic a re mi, ita etiam fa a sol et sol a la. Sed quando mutatio fit, in loco aequali sunt collocatae.

Tertia vero mutatio dupliciter fit, quia aut in vocibus quae in ordine [positae] per diatessaron aut per diapente distant. Per diatessaron tribus modis scilicet fa ut, ut fa, sol re, re sol, la mi, mi la, per diapente autem duobus scilicet la re, re la, sol ut, ut sol. Quando igitur manus est imperfecta, in gamaut, in a re, in b mi, in e la permutatio fieri non [potest], quoniam unius vocis non est sed duarum aequalium, propter quod etiam in utroque b fa & mi non fit.

descending, to be sure, is that which consists of descending notes such as on c sol fa ut: sol fa, fa sol; on d la sol re: la sol, sol la; and on their octaves. And so it always happens among notes that according to [their] order are distant by a tone. I say "according to [their] order," since as it was said above: just as ut is distant from re by a tone, thus also mi from re, fa from sol, and sol from la. But when a mutation is made, they are arranged on an equal position.

But the third mutation is made in two ways, because in the notes that are placed in order they are distant either by means of a diatessaron or a diapente. [They are arranged] by means of the diatessaron in three ways—that is: (1) fa ut, ut fa; (2) sol re, re sol; (3) la mi, mi la. However, [they are arranged] by means of the diapente in two ways, that is: (1) la re, re la; and (2) sol ut, ut sol. Therefore, when the hand is imperfect, a permutation cannot be made on r ut, a re, b mi, [or] on e la, since [a permutation] does not consist of only one note but of two equal [notes]; also for that reason [a permutation] cannot be made on either b fa or l mi.
In arte prima imperfecta, ubi igitur tantum duae voces erunt aequales, duae fient mutationes: una a prima voce in secundam et alia e converso. Sed cum tres fuerit, hunc modum tenebunt: a prima in secundam et e converso fiunt duae et a prima in tertiam et e converso aliae duae et a secunda ad tertiam et e converso aliae item duae et sic sex habebuntur. Sed cum secundo vocem ascendentem nominamus, mutationem in ascendendo causari dicunt.

Sed ulterius addunt illi vocis proprietatem scilicet $\phi$ quadrati aut $b$ mollis sive naturae. Naturae autem appellant hexachorda, quae in utroque c sunt inchoata. $\psi$ quadrati, quae a g, $b$ mollis vero, quae ab f. Ut ergo uno concludamus exemplo, per quod in aliorum cognitionem facile veniatur, dicimus in g sol re ut sol re, re sol, sol ut, ut sol, re ut, ut re: sol re in ascendendo de natura in $b$ molle, re sol in descendendo de $b$ mollis in naturam, sol ut in ascendendo de natura in $\phi$ quadrum, ut sol per

In the first imperfect method then, where there will only be two equal notes, they will make two mutations: one [mutation] from the first note to the second [note], and the other [mutation] vice-versa. But when there will be three [notes], they hold to this rule: they make two [mutations] from the first [note] to the second [note] and vice-versa; [they make] another two [mutations] from the first [note] to the third [note] and vice-versa; and [they make] another two [mutations] from the second [note] to the third [note] and vice-versa; and thus they will have six [mutations].

But when we name a note ascending in the second [way], they say that the mutation takes place while ascending.

But farther on they add the property of the note to it—that is, [the property] of square $\phi$ or soft $b$, or, if you prefer, [the property] of nature. Now they name the hexachords that are begun on the first or the second c, naturae; [they name the hexachords] that are begun from g, square $\phi$; and [they name the hexachords] that are begun from f, soft $b$. Therefore, so that we may conclude with an example through which we may easily arrive at the knowledge of others, on g sol re ut we say: sol re, re sol, sol ut,
contrarium, re ut in ascendendo de \( b \) molli in \( \frac{3}{4} \) durum, ut re in [descendendo] de \( \frac{3}{4} \) quadro in \( b \) rotundum. Hoc enim modo servato in aliis locis quisque per se poterit per ea, quae dicta sunt, has permutationes investigare.

Sed et hoc habito fundamento in manu perfecta facile de omnibus sex vocibus in eodem loco positis mutationes omnes facere poterit. Unde exempli gratia capiamus d sol re, ubi sex voces fuerunt locatae, iungemusque la modo praedicto scilicet cum vocibus, quae in ordine per tonum aut diatessaron aut per diapente distaverint, dicemusque la sol, sol la habebimusque duas; deinde cum mi scilicet la mi, mi la et erunt quatuor; at cum re, quia per diapente coniungendo, iterum binas facimus permutationes scilicet la re, re la. Ex la igitur sex provenire non dubitamus.

ut sol, re ut, ut re. [For] sol [becomes] re in ascending from natura to soft \( b \); re [becomes] sol in descending from soft \( b \) to natura; sol [becomes] ut in ascending from natura to square \( b \); ut [becomes] sol [moving] in the opposite direction; re [becomes] ut in ascending from soft \( b \) to hard \( \frac{3}{4} \); ut [becomes] re in descending from square \( b \) to round \( b \). For with this method observed in the other positions, and through the things that have been said, everyone will be able to investigate these permutations for themselves.

But also, when this foundation has been considered on a perfect hand, one will easily be able to make all the mutations out of all six of the notes placed in the same position. Whence, for the sake of example, let us take d sol re--where the six notes have been established--and we will add la [to it] in the manner mentioned before--that is, with the notes in an order that will have been distant by a tone or a diatessaron or a diapente. For we will have two [permutations] by saying la sol, sol la; then there will be four [permutations] with mi--that is, la mi, mi la; but we make two permutations again by uniting [la] with re by means of the
Qua dimissa sol capiatur et fient eodem modo sex
scilicet sol fa, fa sol, sol re, re sol, sol ut, ut sol. La solque dimissis
fa capiatur, quae solum cum voce ut iungi poterit, eruntque quatuordecim.
Sed mi cum re et re cum ut combinatis quatuor
efficiunt. Ubicumque ergo sex voces reperiuntur, decem octo fieri
mutationes videntur. In c fa ut igitur, quoniam
deficit la, duodecim erunt, in b mi sex tantum, sed quattuor in a re. In Γ
ut duas tantum habebis; eodemque modo b fa & mi secundo sicut c fa ut et e
la sicut Γ ut. Sic et cetera signa vel loca inter ista contenta.

diapente—that is, la re, re la. Therefore, we do
no doubt that six [permutations] appear from la.

After this [la] is dismissed, let sol be
taken, and six [permutations] will be
made in the same way, namely sol fa, fa sol,
sol re, re sol, sol ut, ut sol. [With] la and sol
dismissed, let fa be taken, which will only be
able to be joined with the note ut, and [then]
there will be fourteen [permutations]. But mi
combined with re and re combined with ut produce
four [more]. And therefore, whenever six
notes are found, eighteen mutations seem to be made.
Therefore, on c fa ut there will be twelve
[permutations], since it lacks la; on b mi [there
will only be] six; and on a re [there will only be]
four. On Γ ut you will only have two
[permutations], and in the
same way with the second
b fa & mi as c fa ut and
e la as Γ ut. Thus, the
rest of the signs or
positions are likewise
extended among these
[hexachords].
Disposita iam manu perfecta et eorum, quae ad eius perfectionem requiruntur, forma praescripta super sunt nobis aliqua subtilius investiganda, quoniam, etsi dictum sit a d sol re usque a la mi re secundo sex voces esse in quolibet loco repertas et ex illis quoque sex vocibus decem et octo mutationes causari, de vocibus guidem verum est, sed de mutationibus minime.

Ad cuius evidentiam dispositione figura cum vocibus Guidonis a gamaut usque e la, quae dicetur ordo naturalis ex eo, quod voces naturaliter sunt dispositae, sicut ex monochordi regularis [proveniunt] divisione. Sed haec eadem figura ad latus eius sinistrum tono intensa disponatur, sic et ad dextrum per eundem tonum remissa. Ex hac figurae dispositione reperiemus quemlibet tonum ordinis naturalis ab [altero] accidentalium esse divisum, qua divisione omne

Now that the perfect hand has been arranged, and the forms that are required for its perfection have been outlined above, there are some matters that we should investigate in greater detail. For it has been said that there are six notes found in any place whatsoever from d sol re up to the second a la mi re, and also that eighteen mutations are produced from those six notes. Certainly [this] is true in respect to the notes, but by no means in respect to the mutations.

For evidence of this, let the figure be arranged with the notes of Guido from G ut up to E la. This will be called the natural order, because the notes are arranged naturally just as they appear in the division of the regular monochord. But let this same figure on its left side be arranged with the tone raised; and likewise also on its right side let it be lowered by the same tone. We will discover from this arrangement of the figure that any tone of the
instrumentum perfectum
divisum esse debet.
Namque ab a re in b mi
tonus naturaliter est,
quia re mi. Sed cum ex
ordine accidentalis tono
remissa sit mi aequalis
vox ipsi re naturalis,
relinquitur, quod fa vox,
qua ab ista voce mi
sequitur, non attinget mi
naturalis ordinis, cum
illa semitonium faciat et
ista tonum intendat.
Praeterea cum a b mi ad c
fa ut ordinis naturalis
semitonium fit, quia mi
fa, et a re accidentalis
sinistri, quae illi mi est
aequalis, sequetur mi tono
elevatum, relinquitur,
quod altior erit per
semitonium voce fa
naturalis, et sic tonus
naturalis, qui a c fa ut
ad d sol re cantitur, in
duo semitonia manet
divisus.

Rursus cum a d sol re ad
e la mi tonus naturaliter
fit, quia re mi aut sol
la, et illi re aut sol
naturalis mi accidentalis
dextri fit coaequalis,
sequitur, vox fa, quae
semitonium faciet tonum
illum, qui inter d sol re
et e la mi est, dividendo,
ad vocem mi naturalis
natural order is divided
by another [note] of the
accidental [orders]; [and]
every perfect instrument
ought to be divided by
this division. For since
there is a tone from re
to mi there is naturally a
tone from a re to b mi.
But when it is lowered by
a tone on account of the
[right] accidental order,
mi is equal to re of the
natural [order], whereas
the note fa—which follows
after this note mi--will
not arrive at [the same
place as] mi of the
natural order, since the
former produces a semitone
and the latter ascends a
tone. Moreover, a
semitone is made from
b mi
to c fa ut of
the natural
order—since [there is a
semitone from] mi to fa--
and after re of the left
accidental [order]--which
is equal to mi [of the
natural order]--mi will
follow elevated by a tone,
because it will be higher
by a semitone than the
note fa of the natural
[order]; and thus the tone
of the natural order that
is sung from c fa ut to
d sol re remains divided
into two semitones.

On the other hand, when
a tone is made naturally
from d sol re to e la mi
--because re [to] mi or
sol [to] la [produces a
tone]--and mi of the right
accidental [order] is made
equal to that re or sol of
the natural [order], it
follows that the note fa
--which will produce a
ordinis non attinget. Quemadmodum igitur in hoc fecimus tetrachordo, lector subtilis in reliquis faciet inspecta figura [in hoc] margine posita.

Diceret tamen aliquis, quod, licet possint fieri ad libitum istae coniunctae, mensura tamen non, ad quod breviter dicimus: ita evidentem fient atque sine labore sicut ipsemet ordo naturalis factus fuit in prima figura. Ad quod examinandum disponatur prima mensurata figura, deinde faciemus coniunctas mollis hoc modo: Duplicata quantitate $q_i$ signabimus primam $b$ mollis coniunctam; sic prima $b$ eritque inter $a$ et $b$. Deinde quantitas chordae $i$ et prima $b$ medio dividatur signeturque secunda $b$, quae erit inter $d$ et $e$. Quodsi secunda $b$ q mediam divisorimus quantitatem, signabimus [quartam] $b$ inter $l$ et $m$. Sed quarta $b$ secunda $b$ quantitate per medium divisa signabimus [tertiam] $b$. Sed tertia $b$ quantitas si per medium dividatur, quinta $b$ signabitur. Habebimus igitur ex hac divisione quinque $b$ mollis coniunctas ex recta divisione perpensas.

semitone by dividing the tone that is between $d$ sol re and e la mi—will not arrive at [the same place as] the note $mi$ of the natural order. Therefore, having viewed the figure placed in this margin, the reader will continue in greater detail to do in the rest of them as we have done in this tetrachord [see Figura 4]. Nevertheless, anyone might say that although these coniunctae can be made according to one's pleasure, the [string] has still not been measured. We will address this briefly [and] thus [these things] will be made more evident and without difficulty, just as the natural order was created in the first figure. The first measured figure is arranged for the purpose of examination. Then, we will make the coniunctae of soft $b$ in this way: with the quantity of $q$ to $i$ doubled, we will designate the first coniuncta of soft $b$; thus the first $b$ [$bb$] will be between $a$ and $b$. Then, let the quantity of the string from $i$ to the first $b$ be divided in half, and let the second $b$ [$eb$] be designated, which will be between $d$ [and] $e$. And if we will divide the quantity from the second $b$ to $q$ in half, we will designate a fourth $b$ [$eb$] between $l$ [and] $m$. And we will designate the third $b$
Sed si [†] quadrati coniunctas, per tria b q dividemus et a littera q versus b venientes in fine trientis ponemus [quartam] § scilicet inter n o et in besse [secundam †] quadratam, quae cadet inter f g. Sed si secundae [†] quadratae q quantitas per tria dividatur, a littera q versus secundam † quadratam venientes in besse ponemus tertiam † eritque inter k l, cuius et q quantitas si duplicetur, proveniet sic prima † inter c d signata. Habeimus igitur ex hac divisione quatuor † quadrati coniunctas ex recta divisione provenientes, ut patet in figura.

But if we want to have the coniunctae of square †, we will divide [the quantity] b to q into three [parts], and advancing from the letter q toward b, we will place the fourth square † [‡] at the end of the third [part]—namely, between n and o; and at the two-thirds [part we will place] the second square † [‡], which will fall between f [and] g. And if the quantity of the second square † to q is divided into three [parts], advancing from the letter q toward the second square †, we will place the third square † [‡] at the two-thirds [part] and it will be between k [and] l; and furthermore, if this quantity is doubled from q, then the first square † [‡] will appear marked between c [and] d. Therefore, from this division we will have four coniunctae of square † arising from a proper division, as it appears in the figure [see Figura 5].

[‡b] by dividing the quantity from the fourth † to the second † in half. And a fifth † [‡b] will be designated if the quantity of the third † to q is divided in half. Therefore, from this division we will have five coniunctae of soft † calculated according to a correct division.
Si enim quintam habere voluerimus, tertia \( \frac{q}{p} \) quantitatem medio dividamus et erit supra \( p \) per duos tonos. Verum quia nihil sub proslambanomenon nec supra neten hyperboleon in mensurata figura addere volumus, non eam ponimus, non ex eo, quod fieri non posset, sed quia ista tenuerunt antiqui et a Boetio sic traditam reperimus doctrinam.

Quando ergo addere aliquid sub aut supra voluerimus non in eadem chorda, sed in diversis, facere poterimus concordantes illas chordas cum his divisionibus in una recte factis in diapason correspondentes ut puta: si unam chordam addere sub proslambanomenon voluerimus, taliter disponemus, quod in sono diapason aequisumet lichanos meson et erit \( \Gamma \) ut, et si aliam sub ista, cum parhypate meson aequisonabit in diapason, diapente cum parhypate hypaton, diatessaron cum prima coniuncta. Haec chorda erit, quam dicunt moderni retropolis, ut supra iam diximus, in qua paene omnia modernorum instrumenta, quae polychorda, in Italia reperimus incepta, etiam organa et alia instrumenta

In fact, if we want to have a fifth [coniunctae of square \( \frac{q}{p} \)], let us divide the quantity of the third square \( \frac{q}{p} \) to \( q \) in half, and [the fifth square \( \frac{q}{p}, c\# \)] will be above \( p \) by two tones. But since we do not want to add anything in the measured figure below proslambanomenos nor above hyperboleon, we do not place it [there]; not because it cannot be done, but because the ancients held to these things, and we [also] find the doctrine handed down from Boethius in this manner.

Therefore, when we will want to add something below [proslambanomenos] or above [hyperboleon], we can do it, not on the same string but on different [strings], harmonizing those strings at the corresponding diapasons with these divisions [that were] realized correctly on one [string], as for example: if we will want to add a string below proslambanomenos, we will arrange [it] in such a manner that the diapason may be equal in sound to lichanos meson, and [thus the note] will be \( \Gamma \) ut. And if [we will want to add] another [string] below this, it will sound equal to parhypate meson at the diapason, to parhypate hypaton at the diapente, [and] to the first coniuncta at a diatessaron.\textsuperscript{106} This string will be that which...
 completa, quae per semitonia sunt divisa. In Hispania vero nostra antiqua monochorda et etiam organa in c gravi reperimus incepisse. Sed modernorum polychorda et etiam organa octo voces sub c gravi in ordine ponunt naturali.

Non tamen habent voces coniunctas \( b \) quadrati sive \( b \) mollis sub proslambanomenon, sed tantum est diapente recta sub \( \Gamma \) ut, ita ut \( \Gamma \) ut sit octava \( g \) sol re ut, retropolis octava sive diapason \( f \) fa ut et alia diapason \( e \) la \( \text{mi} \) aliaque \( d \) sol re et alia \( c \) fa ut octava sub \( d \) sol re idest diapason, iam hic Bononiae repperimus polychordum, sed sub \( c \) fa ut non nisi in Hispania. Verum non refert, ubi quis incipiat, modo chordarum modi et divisiones semitoniorum et tonorum observentur.

Nevertheless, they do not have the coniunctae notes of square \( b \) or of soft \( b \) below proslambanomenos, for the diapente below \( \Gamma \) ut contains only recta [pitches],\(^{108}\) so that \( \Gamma \) ut is an octave [from] \( g \) sol re ut, the retropolis is an octave or, if you prefer, a diapason [from] \( f \) fa ut, and [there is] another diapason [from] \( e \) la \( \text{mi} \), and another [from] \( d \) sol re, and another octave—that is, a diapason—[from] \( c \) fa ut below \( d \) sol re. Now we have found [such] a polychord here in Bologna, but in Spain we have not found anything below \( c \) fa ut. But it does not matter where anyone begins, provided that the quantities of the strings and the divisions of the moderns call retropolis, as we have mentioned above. In Italy, we find that almost all the instruments of the moderns that are polychords begin on this [retropolis]. [This is also true of] organs and other complete instruments which are divided by means of a semitone. But in Spain we find our ancient monochords and also our organs to begin on \( c \) grave. But the polychords and also the organs of the moderns establish eight notes below \( c \) grave in the natural order.\(^{107}\)
Habent se igitur ista
tetrachorda sicut
synemmenon et
diezeugmenon. Inde est
ergo, quod isti
contemporanei nostri
coniunctas appellant; sed
etiam disiunctas improprie
vocant, quando sine
mutatione ab una
propriete in aliam se
transferunt, ut puta: si
reperiantur in c sol fa ut
dicentes fa et ad f fa ut
descendere immediate
[cogantur] et deinde ad
graviores, tunc ille
descensus dicitur
disiuncta, quia fa in
altiori voce et fa in
inferiori pronuntiant.
Sic et quando per diapason
saltus fit, ubicumque fit,
semper disiuncta fiet
necessario. Dixi in
diapason necessario,
quoniam in diapente non
semper fit de necessitate,
sed solum, quando diapente
est mi mi ut e \& aut fa fa
ut [f] k. Sed si [cantus]
fiat ab a la mi re
[existente] cum re et
[descendat] per saltum
diapente, immediate illud
re mutatur in la et
dicitur re la re, quoniam
tunc bene sequitur illud
re ab illo la. Sic et in
g existens cum ut saltu
facto per diapente
immediata non fit
disiuncta, sed mutatur in
sol et dicitur ut sol ut,
quia bene sequitur [illud]
ut ab illo sol.

Therefore, these
tetrachords conduct
themselves just as [the
tetrachords] synemmenon
and diezeugmenon.
Accordingly, from there is
that which these
contemporaries of ours
call coniunctae; but they
also improperly call
[them] disiunctae when
they transfer them from
one property to another
without mutation, as for
example: if they are
found singing fa on
c sol fa ut and they
intend to descend directly
to f fa ut, and then to
[even] lower [notes], then
that descent is called
disiunctae, because they
pronounce fa on the higher
note and fa on the lower
note [as well]. Thus also
whenever a leap is made by
means of a diapason, it
will always necessarily
make a disiuncta wherever
[that leap] is made. I
have said "necessarily" in
regard to the diapason,
since it is not always
done from necessity on the
diapente, but only when
there is a diapente [from]
mi to mi such as e to f,
or from fa to fa such as
f to k. But if [a song]
is composed with re from
the existing a la mi re
and it descends by a leap
of a diapente, that re is
directly changed to la;
and it is called re la re,
since then that re follows
properly after that la.
Thus also disiuncta is not
directly made on the existing $g$ with a leap of a diapente from $ut$ but rather, it is changed to $sol$; and it is called $ut\ sol\ ut$, since that $ut$ follows properly after that $sol$.

The leap of a tritone always causes disiunctae, for example: if a leap occurs from $f$ up to $c\ sol\ fa\ ut$—passing above $\|$ by only one note—then $fa$ is sung on $f$ and $mi$ is sung on $b\ fa\ \|$ $mi$; $c\ fa$ follows, and then it is called disiuncta, since that $mi$ does not follow nor depend upon that lower $fa$. Other leaps that are larger than a diapente always produce disiunctae as much in ascending as in descending, except where $la$ can be assumed in the hexachord, for example: if we have $re$ or $mi$ on a $la\ mi\ re$, the song may be lowered by leap to $c\ fa\ ut$; then $la$ should be taken, and it is sung $mi\ la\ ut$ or $re\ la\ ut$. Otherwise, disiunctae will always occur above the diapente.

Indeed, we ought to observe that which should have been proven—that is, whether or not eighteen mutations can be made in each one of the positions by means of the coniunctae notes. And if one examines the figure closely, it will be easily discerned that the eighteen mutations will be made only on $d\ sol\ re$, \...

\begin{itemize}
\item Tritonus immediatus semper causat disiunctas, $ut\ si\ ab\ f\ fiat\ saltus$ usque $c\ sol\ fa\ ut$
\item transiens $|$ unica notula, $tunc\ dicitur\ in\ f\ fa$ et in $b\ fa\ \|$ $mi\ mi$ et sequitur $c\ fa$ et tunc disiuncta dicitur, quoniam illud $mi$ non sequitur nec dependet ab illo $fa$ graviore. Alii saltus, qui maiores sunt diapente, semper faciunt disiunctas tam in intendendo quam remittendo, praeterquam
\item ubi $la$ possit accipi in hexachordo, $ut$, si in a $la\ mi\ re\ re$ aut $mi$ tenemus, cantus per saltum ad $c\ fa$ ut remittatur; $tunc\ la$ est accipiendum et dicitur $mi\ la\ ut$ aut $re\ la\ ut$.
\item Aliter autem supra diapente semper disiuncta fiet.
\end{itemize}

\begin{itemize}
\item Sed videndum nobis est, quod erat probandum, utrum scilicet decem et octo mutationes in unoquoque locorum per voces coniunctas fieri possint? Quod si bene inspiciatur figura, facillime dignoscetur, quod solum in $d\ sol\ re$, $g\ sol\ re\ ut$ et eorum octavis decem et octo fient mutationes, quoniam in his tantummodo
\end{itemize}
locis sex illae voces aequaliter sunt collocatae, ut patet in figura. In alis vero, quoniam non omnes voces in eadem linea conveniunt, sed aliquae altiores, aliquae vero ponuntur inferiores, non omnes fient decem et octo. In e la mi ergo, ubi fa et ut sunt inferiora, non decem et octo sed tantum erunt 12 hoc modo: ex la sex, sed ex sol tantum duae scilicet sol re, re sol, quoniam neque cum fa combinari potest neque cum ut; ex mi cum re combinata aliae duae et sic sunt 10, sed fa cum ut quia inter aequales, licet cum aliis sint inaequales, alias habebimus duas et sic erunt 12. Sic et in f fa ut, ubi la et mi sunt inaequales, tantum 12 habebimus hoc modo: la mi, mi la tantum duae sunt, sed ex sol 6 provenire non dubitamus et ex combinatione fa cum ut et re cum ut quatuor evenire certum est; igitur duodecim. Sic in e la mi, sed in a la mi re, ubi solum fa est inaequale, quatuordecim erunt. Hoc ideo, quia quatuor cum eo erant fiendae scilicet sol fa, fa sol et fa ut, ut fa et in c sol fa ut similiter. At in b fa & mi duodecin et ita in eorum octavis, ut quisque per se recte poterit videre.

$g$ sol re ut, and on their octaves, since those six notes are properly arranged only on these positions, as it appears in the figure. And in other [positions], all eighteen mutations will not be made, since not all the notes meet on the same line; rather, some are placed higher and others [are placed] lower. Therefore, on e la mi --where fa and ut are lower--there will not be eighteen but only twelve [mutations] in this way: from la [there will only be] six; but from sol [there will be] two--that is, sol re [and] re sol, because [sol] cannot be combined with fa nor with ut; from mi combined with re [there will be] another two, and thus there are ten; but [from] fa [combined with] ut we will have another two, since they are among equals--even though they are unequal with others--and thus there will be twelve. Likewise also on f fa ut--where la and mi are unequal--we will have only twelve in this way: [with] la mi, mi la there are only two, but we do not doubt that six [mutations] appear from sol; and it is certain that four [mutations] will result from the combination of fa with ut and of re with ut; therefore, we will have twelve. Likewise on e la mi; but on a la mi re--where only fa is
Apparet igitur ex his, [quod] non omnibus in locis 18 mutationes fiant; sic et appareat falsitas manus perfectae, quia non est perfecta tribus diapason, quoniam excedit per semitonium. Esset enim perfecta, si illa vox ultima ordinis accidentalis sinistri tantum distaret per semitonium a sua propinqua, et tunc faceret contra ipsum Guidonem suosque sequaces, quia scilicet inter sol et la non toni sed semitonii tantum esset distantia.

Notandum igitur ex hoc, quod cantare per ordinem accidentalem aliquando idem est quod per naturalem. Sola est signorum et linearum differentia, quod semitonium non eodem loco respondeat ut in naturali. Nam si in naturali ordine semitonium erat ab e in f, per signum b in eadem e positum deprimitur et fit unequal—there will be fourteen. This is because four should have been made with it—that is, sol fa, fa sol, and fa ut, ut fa; and likewise on c sol fa ut. But on b fa ti mi [there will be] twelve, and thus on their octaves, as anyone will be able to clearly see for oneself.

Consequently, from this it should be noted that at times, singing according to the accidental order is the same as [singing] according to the natural [order]. The only difference is that of the signs and of the lines, because the semitone does not appear at the same place as [it did] in the natural [order]. For if
Verum cum per aliquem accidentalium ordinem cantare volumus, semitonium sequitur post duos tonos; sic et coniunctum, sic etiam et disiunctum tetrachordum, quod dictum fuit ficta musica. Et tunc cavendum est a naturali sicut ab accidentalis. Quando per naturalem verum, sectatores Guidonis, contemporanei nostri, non ita faciunt, sed ab accidentalis ad naturalem et e contra frequentem se transferunt, quidam forte et casu, quod non intelligant cantus compositionem, quidam vero ex industria astuteque. Sed qui ex industria hoc faciunt, signant lineam vel spatium hoc signo  b vel hoc  et tunc secundum illud signum cantando prosequuntur. Dicunt tamen, quod, si in principio signum positum sit, per totum cantum ordo talis observandus est. At si non in principio sed in processu ponatur, dicunt, quod tantum illa nota, cui apponitur, illius signi subiacet legi. Unde et varias faciunt in the natural order there was a semitone from e to f, it is lowered by the sign b placed on the same e, and [a semitone] is made from the letter d to e. Also in a similar way, if  or  is placed on f, it is raised and [a semitone] is made from f to g.

Truly, when we wish to sing by a certain order of accidentals, the semitone follows after two tones; the same also [with] the coniuncta [tetrachord], and even [with] the disiuncta tetrachord [in the method] that has been called musica ficta. And under these circumstances one should take care [to sing] from the natural [order] just as from the accidental [order]. Certainly when Guido's followers—our contemporaries—[sing] according to the natural order, they do not do it in this way, but frequently they pass over from the accidental [order] to the natural [order] and vice-versa. Some [do this] haphazardly and by chance, because they do not understand the composition of song; but others [do this] astutely and industriously. And whoever does this industriously marks the line or space with this sign b, or with this [sign] , or with this [sign] ; and then they proceed by singing.
considerationes in notulis
elevando scilicet a loco
proprio deprimendoque.
Nam si in b mi notula sit
hoc signo b signata et
post illam sequatur altera
in c fa ut isto ☞,
quamquam semitonii in
ordine naturali sit
intercapedo, propter
depressionem primae et
sublimationem secundae in
[semiditoni] transit
intervalium. Sic et in
 omnibus locis semitonii
distantiam includentibus.
Quod si una oda in e la mi
perscribatur hoc signo b
et altera in c fa ut isto
☞, licet ditoni sit
intervallum, convertitur
in toni distantiam; sic in
quibuscumque locis
praedictam distantiam
includentibus.

Eodem modo de aliis
maioribus speciebus
fiendum dogmatizant et

according to that sign.
Nevertheless, they say
that if the sign is placed
at the beginning [of the
song], such an order
should be observed
throughout the entire
song. But if it is not
placed at the beginning
but rather, along its
course, they say that only
the note where it is
placed is subject to the
law of that sign. Whence
also they make various
considerations in the
raising and lowering of
the notes--that is,
from their proper
position. For if a note
is marked with this sign b
on b mi and after that
another follows on c fa ut
with this sign ☞,
although it is an interval
of a semitone in the
natural order, it passes
over into an interval of a
semiditone on account of
the lowering of the first
[note] and the raising of
the second [note].
Likewise also on all the
positions that include the
distance of a semitone.
And if a note is written
on e la mi with this sign
b, and another [note is
written] on c fa ut with
this [sign] ☞, although
it is an interval of a
ditone, it is converted
into the distance of a
tone; likewise in any
positions that include the
distance mentioned.

Guido's followers
dogmatize that it should
be done in the same way
talís, dicunt, ordo
[servetur], quod semper
signum ✠ in loco
coniunctarum \(\mathfrak{s}\) quadrati
ponatur et hoc \(\mathfrak{b}\)
in illis, in quibus
coniunctae \(\mathfrak{b}\) rotundi
locantur. Johannes vero
de Londonis et alii minus
periti dicunt:
quemadmodum in \(\mathfrak{b}\) fa \(\mathfrak{s}\) mi
ambo signa possunt locari,
ita et in aliis locis, ubi
nec fa nec mi. Quod ita
fieri possit, minime
negandum est; at quod
debeat, concedendum non
arbitror.

Consequently, on that
account and according to
[that which] has already
been said, if a tone
remains divided into two
semitones, by [this] error
the rest of them become
useless. For it is
permitted according to
this method, just as it
has already been said,
that we can have a tone
and a semitone from any
note, as for example from
\(\mathfrak{b}\) fa \(\mathfrak{s}\) mi. For they say
that if on \(\mathfrak{g}\) sol re ut a
soft note is marked with a
\(\mathfrak{b}\) preceding [it], and on
the same [place] another
[note] is marked with this
[sign] \(\mathfrak{s}\) preceding [it],
although they seem [to be]
a unison, nevertheless,
because of the lowering of
the first [note] and the
elevation of the second
[note], [it is the
per aliud semitonium
depressa est ab illo loco
et secunda alio semitonio
ab illo loco elevata, duo
semitonia sunt. Ergo toni
differentia et non
semitonii est, tamquam ut
re. Eodem modo dicunt in
d sol re et istorum
octavis.

Horum quae dicta sunt
exempla subtili lectori
relinquisimus invenienda,
ita ut quatuor aut quinque
extendat lineas et aliquam
signet illarum littera
sive clavi alterata duarum
supradictarum et notulas
disponat cum signis, sicut
diximus. Incipit ex hoc,
dumtaxat ex Guidonis
doctrina, prolapsa
confusio. Eius enim
sectatores pertinaciter
credunt et pro indubitato
habent, quod nisi inter fa
et mi non possit fieri
semitonium.Dicunt,
propter [quod] mi
claudens os austeritatem
denotat, fa vero laxans os
[mellitiem] signat. Hoc
autem nihil esse
rationibus firmissimus et
mathematicis cognita
distance] of a semitone,
such as mi to fa. [But]
they speak incorrectly
for two reasons: (1) even
if the first [note] did
not have a sign, the
second [note] would still
be higher than it at least
by a semitone on account
of the sign; [and] (2)
they err, because if the
first [note] has already
been lowered from that
position by a semitone and
the second [note] is
raised from that position
by another semitone, there
are two semitones.
Therefore, there is a
difference of a tone
rather than a semitone
such as ut to re. In the
same way they speak of
d sol re and its octaves.

We leave [it] to the
discriminating reader to
find the examples of these
things which have been
said. Let him draw four
or five lines, and let him
mark one of them with a
letter, or with one of the
two clefs mentioned above,
and let him arrange the
notes with the signs just
as we have discussed. Of
course, the confusion that
leads one to ruin begins
from this--[that is], from
Guido's teaching. For his
followers tenaciously
believe [and] indubitably
hold [to the idea] that a
semitone cannot be made
except between fa and mi.
Therefore, they say that
closing the mouth [to say]
mi denotes severity and
opening the mouth [to say]
musicae differentia curabimus ostendere.

fa signifies sweetness.\textsuperscript{109} However, recognizing the differentia musicae,\textsuperscript{110} we will take care to demonstrate with the firmest reasons and mathematics that this is of no value.
<table>
<thead>
<tr>
<th></th>
<th>la</th>
<th>sol-fa</th>
<th>mi</th>
<th>fa</th>
<th>sol</th>
</tr>
</thead>
<tbody>
<tr>
<td>la</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
</tr>
<tr>
<td>sol-fa-ut</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
</tr>
<tr>
<td>mi</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
</tr>
<tr>
<td>fa</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
</tr>
<tr>
<td>sol</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
</tr>
</tbody>
</table>

Figure 25. Figura 4 of the Musica practica, 27.
Source: Johannes Wolf, ed., Musica practica, 35.
Figure 26. Figura 5 of the Musica practica, 28.
Source: Johannes Wolf, ed., Musica practica, 36.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
CAPITULUM SEXTUM
QUOD MUSICAE DIFFERENTIA
NON EST IN QUALITATE
SED IN QUANTITATE

Est enim differentia
musicae in quantitate
arsis vel thesis
constituta, non autem in
magitudine sive
fortitudine aut voci
debilitate collata. Cum
enim in arte Guidonis tres
vocum proprietates inter
se [differentes] ponantur,
necessae est, inter voces
aequales differentiam
ponat. Nam in g sol re ut
sol naturae a re b mollis
vel ab ut e duri
differentiam faciat
necessae erit. Sic et re
ab ut. Ergo aequales non
sunt et per consequens
mutatio in eis fieri non
possit. Et tamen ipsi
faciunt per suam doctrinam
iam superius propalatam.
Ergo ipsi sibi
contradicant necessae est.

SIXTH CHAPTER
THE DIFFERENCE OF MUSIC
IS NOT IN QUALITY
BUT IN QUANTITY

For the difference of
music is built upon the
quantity of the arsis and
thesis, and it is not
based upon the magnitude
or, if you prefer, the
strength or weakness of a
note. For when the
three properties of the
notes--differing among
themselves--are arranged
in Guido's theory, it is
necessary to establish the
difference between the
equal notes. For it will
be necessary to make a
difference between
g sol re ut (the sol of
the natural [hexachord])
and re of the soft b
[hexachord] or ut of the
hard e [hexachord].
Likewise also [it will be
necessary to make a
difference between] re and
ut. As I was saying, they
are not equals, and
consequently a mutation
cannot be made upon them.
And nevertheless, they
[Guido's followers] make
[a mutation] according to
their doctrine that was
already discussed above.
Therefore, it is necessary
for them to contradict
themselves.

Quidam vero, ut Magister
Osmensis Hispanus, qui
tractatum quendam in hac
edidit facultate, putant

But some such as the
teacher of Osma—the
Spaniard who published a
certain treatise on this
se ad inconveniens ducere hoc modo dicentes: si non [different] fa et sol in c sol fa ut, non ponerentur, quia frustra fit per plura. Sic ergo ponuntur, quia differunt; ita et reliquae voces alibi locatae. Sed istud inconveniens nullum est, quoniam ponuntur ibi ad faciendum semitonium longius aut propinquius, ex quo provenit differentia musicae. Nam si omnes intercapedines essent aequales tonorum aut semitoniorum, nulla esset musicae differentia. Quod si per inconveniens solvere volumus, multis dubitationibus hoc idem facere poterimus. Cum enim dicant voces § duri a vocibus b mollis differre, idem a se ipso differre nescientes consentiunt, quod aliquibus exemplis comprobavimus. Est enim in c fa ut fa § [duri]. Manifeste ponunt ibidem mi per §; coniunctam propter hoc enim ponunt, quia differentiam inter fa et mi magnum cognoscunt, et tamen utraque vox est § quadrati. Ergo idem differat a se ipso, quod erat probandum. Sic et in a la mi re; ubi est mi b mollis, ponitur fa coniunctae b mollis. Ergo b molle differat a b molli.

practice—believe that they are guiding [students] inconsistently, when they say in this way: "If fa and sol were not different, they would not be arranged on c sol fa ut, since it is done by means of many [syllables] for no [real] purpose. Therefore, they are arranged in this manner because they are different; likewise also the remaining notes that are arranged elsewhere." But this is by no means inconsistent, since they are arranged there for the purpose of making a semitone farther or closer, from which the difference of music arises. For if all the intervals of the tones or of the semitones were equals, there would not be a difference of music. But if we wish to resolve this inconsistently, we will be able to do this same thing with many doubts. For when they say that the notes of the hard § [hexachord] differ from the notes of the soft b [hexachord], without knowing [it] they affirm that the same differs from itself, which we have confirmed with some examples. For fa of the hard § [hexachord] is on c fa ut. In that very place they clearly arrange mi by means of §, for on account of this they establish a coniuncta, since they recognize the great difference between fa and mi, and
nevertheless, both of the notes are from square $\mathfrak{4}$.
Therefore, as it was necessary to demonstrate—the same differs from itself. Likewise also $fa$ of the conjuncta of $soft\ b$ is arranged on $a\ la\ mi\ re$ where there is $mi$ of $soft\ b$. Therefore, $soft\ b$ differs from $soft\ b$.

Certainly it is absurd to place the difference in music between the notes of hard $\mathfrak{4}$ and [the notes of] soft $\mathfrak{b}$, or [the notes of] the natural, which Brother Johannes of Santa Domingo, a teacher of theology, attempted to confirm. But since he did not write a book, nothing should be said about him. But Brother Johannes Hothby, the English Carmelite who arranges the hard, the soft, and the natural semitone, perceived [it] by far the worst [of all]. Certainly he properly adopted the numbers for his monochord, since they are the same ones that Boethius arranges on his [monochord].

Nevertheless, I do not think that the difference of a semitone was taken from him, but from someone untrained. And let me say about [Hothby] that which Brother Johannes Carthusiensis was accustomed to saying of Marchettus. For it has not been heard for a long time [that one may] arrange the semitone in three ways, namely:
Sed non miror, quia sequax Guidonis est. Ego enim caput conterere volo, ut corpus istud in erroribus constitutum cadaver iam fiat nec amplius vivere possit.

Praeterea iste magister Osmensis iam allegatus dicit: istae tres proprietates scilicet durum, molle et natura sic se habent sicut illa tria genera melorum, quae ponuntur a Boetio scilicet: diatonicum, chromaticum et enharmonium, quoniam diatonicum, quod aliquantulum durius est, dicit quadrati similitudinem tenere, enharmonium vero, quod magis ad molle coaptatum est, molli comparat, chromaticum vero, quod inter utrumque medium tenet, naturae imaginem servat. Hoc autem iam, cum in studio legeremus Salmantino, praesente et coram eo redarguimus et in tractatu, quem ibi in hac facultate lingua materna composuimus, ipsi in

chromatic, enharmonic, and also diatonic, because as [Johannes Carthusiensis] says: "Who has ever heard from some well-grounded teacher that there are three ways [to arrange] a semitone if not from this little Marchettus?" I believe that Brother Johannes Hothby may have taken some [of his] foundation from him. But I do not marvel [at this], because he is a follower of Guido. Truly, I wish to destroy the head, so that this body [of knowledge] undertaken in errors may become a corpse, and not be able to live [any] longer.

Furthermore, this teacher of Osma already mentioned above says: "These three properties—that is, hard, soft, and natural—conduct themselves thusly just as those three genera of melody, which are arranged by Boethius, namely: diatonic, chromatic, and enharmonic," since he says that the diatonic [genus], which is somewhat harder, has a resemblance to square; but he compares the enharmonic [genus], which was associated more with soft, to soft; and [he says that] the chromatic [genus], which he holds in the middle between [the diatonic and the enharmonic genus], preserves the image of the natural. However, we have already refuted this
omnibus contradiximus adeo, ut ipse viso et examinato tractatu meo hoc dixerit: Non sum ego adeo Boetio familiaris sicut iste. Nam ego quidem probavi in duobus aliis generibus esse $\flat$ durum et $b$ molle sicut in isto. Ibidem enim tetrachordum synemmenon reperiri non dubito et alia partition illorum est, alia vero istius.

Partiamur enim tetrachorda chromatici per semitonium, semitonium et trihemitonium, hoc est: primum intervallum est semitonii et secundum semitonii, sed tertium est trihemitonii sive semiditone. Enharmonium vero genus semitonium dividit in duas partes, quae dieses appellantur, et sic duo spatia prima singulas dieses tenent; at vero tertium intervallum [ditonum] amplectitur. De his tamen generibus nihil ad praesens tractamus, quoniam in fine huius primae partis ea in practicam ponemus notulis signatis.

publicly in his presence when we were doing research in Salamanca, and in the treatise that we published in the mother tongue while on the faculty there. We have contradicted him on everything to such a degree that he himself, after viewing and examining my treatise, said: "I am not as familiar with Boethius as he is." For indeed, I demonstrated that hard $\flat$ and soft $b$ are in the two other genera just as in the latter. For I do not doubt that the tetrachord synemmenon is found in the same place, and that there is one division of former, and another division of the latter.

For let us divide the tetrachords of the chromatic [genus] by a semitone, a semitone, and a trihemitone—that is: the first is an interval of a semitone, and the second is [an interval] of a semitone, but the third is [an interval] of a trihemitone or, if you prefer, of a semiditone. But the enharmonic genus divides the semitone into two parts, which are called dieses, and thus the first two intervals each have a dieses; but truly the third interval encompasses a ditone. Nevertheless, for the present we will treat nothing in regard to these genera, since at the end of this first part we will
Nunc autem qualiter non semper inter mi et fa sit semitonium declarèmus, et qualiter mutationes coniunctarum sint necessariae dicemus vel voces tonales efficientur semitonales, et ditonales semiditonales et e contra. Iuxta quod recte intelligendum quae sequuntur diligenter perscrutemur. However, now let us explain how there is not always a semitone between mi and fa, and we will discuss how mutations of the coniunctae are necessary, or [how] tonal notes will produce semitonal notes, and [how] ditonal notes [become] semiditonal [notes], and vice-versa. Immediately afterwards, let us examine that which should be properly understood--[the theories] which they [so] diligently follow.
Certainly with the difference of music having been examined and clearly perceived, there remains to be shown how the tonal notes produce semitonal notes and vice-versa. In addition, it should be known—as Johannes of Villanova says—that the song prefers for the note to be made hard while ascending and to be made soft while descending. Whence, he himself says that if a song is sung a c d and it does not return to c, although it should be called re fa sol— as the order demonstrates— nevertheless, it should be called ut mi fa on account of this: a c is not the interval of a semiditone but of a ditone; or if it is sung with those same notes—that is, re fa—let it be called a ditonus subintellectus.121 Likewise, if the song is made in this manner g f g and it does not touch upon f again, it is a semitonius subintellectus122 even though it may be called sol fa sol or re ut re.

The same man [Johannes of Villanova] believes that the synemmenon should always be performed when...
in mese, sive a gravibus litteris ad ipsum pervenerit, sive ab acutis descendens ipsum tetigerit, praesertim si pluries eundem locum repercuserit. Idem quoque, si cantus hunc progressum fecerit d b c d c d d et in suis octavis; b c est tonus et c d semitonia bis factum et sic aut subintellecte voces tonales tenebunt semitonia aut mutatio fiet mi in re, quae vox est coniunctarum.

Etiam dicit ipse Johannes ex ditono semiditonum fieri hoc modo: Si cantus dicat la fa sol sol non veniens iterum ad fa, aut subintellecte semiditonus erit aut mutatio fiat la in sol, ut dicatur la sol mi fa fa; et ad hunc modum diligens lector de aliis poterit iudicare hoc modo dispositis. Et tales notae debent esse signatae hoc signo scilicet $\frac{1}{4}$ vel isto $\times$. Ad maiorem evidentiam igitur, qui cantum componere vult, multum debet advertere circa haec, de quibus etiam subtilius in secunda parte dicemus. Nunc vero ad confusionem ex Guidonis vocibus consecutam declarandam paucas ista sufficiant.

after a note is placed on $b \text{ fa } \frac{1}{4} \text{ mi}$, another [note] follows on mese or, if you prefer, it will either arrive at it from the lower letters or it will touch upon it while descending from the higher letters—especially if it strikes the same place several times. The same will also [occur] if the song produces this progression: $d \text{ b c d c d d}$ and on its octaves, [for] $b \text{ c}$ is a tone [and] $c \text{ d}$ is a semitone that occurs twice; and thus either the tonal notes will include a semitonus subintellectus, or the mutation $\text{mi}$ to $\text{re}$ will be made, which is a note of the coniunctae.

Furthermore, Johannes himself says that a semiditone is made from a ditone in this manner: "If the song proclaims $\text{la fa sol sol}$, not returning again to $\text{fa}$, either it will be a semiditonum subintellectus or the mutation $\text{la}$ to $\text{sol}$ is made, so that it is sung $\text{la sol mi fa fa}$; and in this manner the diligent reader will be able to judge [for himself] concerning the rest [of them] arranged in this way. And such notes should be marked with this sign—that is, $\frac{1}{4}$—or with this [sign] $\times$. Therefore, for greater clarity, whoever wishes to compose a song should pay a lot of attention in respect to this [matter], which we will discuss in even
greater detail in the second part. But [for] now, let these few [words] suffice in order to clarify the confusion that resulted from the syllables of Guido.

Certainly Brother Johannes Carthusiensis himself spoke properly concerning these mutations: "I do not proclaim it a mutation when a note is changed into [another] note but rather, a variation from an interval [of one quality] to an interval [of another quality]." It is only important to notice the tones and the semitones, and to sing according to the letters of Gregory. Of course, I [also] say this about my syllables. For whoever desires to sing according to our syllables will only be obligated to make a single mutation within a diapason -- that is: when the song climbs beyond c acutae we will change tas to psal, and thus the mutation tas psal will be made; but when they desire to come down, they will change psal to tas. Truly, it should also be done in this manner in the low [range]. And yet, let not the students be forced to do this, since sometimes we permit [them] to say one in place of the other. But let them only become accustomed to noticing the rules mentioned above -- that is, to observe the
For in respect to the syllables of Guido, the Catholic faith of the new theorists has grown to such a degree on account of the length of [its] usage that when Ugolino Urbeveteranus of Ferrara--a recluse in the cathedral--begins to deal with the syllables, he calls them [according to] the Greek names and adds: "The Greeks only had five [syllables], namely re, mi, fa, sol, la, lacking ut." He demonstrates that this is because their art begins from proslambanomenos--that is, a re. After that, he concludes his endeavor; but this should not be brought to the light nor made public but rather, it should be regarded with laughter and mockery.

Therefore, we, [who are] wonderfully delighted in this our new form of the most beautiful art, have decided to begin the song on c, not only because that note holds a nobler sound--as it will be discussed later--but also because, as Guido himself says, we encounter it first by the very nature of the numbers. Therefore, we will make one diapason
diapason musica nostra contineatur, ut non solum sit utilis ecclesiastico cantui, verum etiam seculari curiosiori. Erit igitur musica Gregorii, Ambrosii, Augustini, Bernardi, Isidori, Oddonis Enchiridion, Guidonis, qui ab istis quasi totam assumpsit, suorumque sequentium sicut lex scripturae, quae non omnibus data fuit; nam aliqui sine ea hodierna die cantant. Nostra autem catholica sive universalis erit sicut lex gratiae, quae legem scripturae in se continet atque naturae. Sic etiam nostra totum, quod isti ecclesiastici viri et sapientissimi musici antiqui dixerunt et invenerunt, continebit.

Cum igitur octavam sub c ponimus vocem, ne mirentur Italici, quia constat non esse novum, sed frequentissime usitatum et omnia fere polychorda neotericorum illud habent. Antiquorum vero monochorda in eadem c gravi fecisse principium reperitur per instrumenta. Inde ergo nos in cantu in eadem littera statuismus principium, in monochordo autem secundum Graecos Boetium securi in a.

Therefore, when we place the note c an octave below, let not the Italians be amazed, since it is agreed that it is nothing new but rather, it is the most common usage; almost every polychord of the new theorists contains that [extension]. And it has been learned by means of the instruments that the monochords of the ancients began on the same c grave. Therefore, from there we have established
And now I will discuss art—that is, [how] we arrange the letters with the notes on the palm for the purpose of singing by means of the joints of the fingers according to this method. We arrange the notes not without reason as Guido [did] by a whim, but with the greatest similitude of reason in this manner: Let the concave [part] of the instrument be in the concave [part] of the hand where silence is placed, since no note should be made there, and it will be as the ground. Then, the first note will be placed upon the wrist, below which nothing should be placed [any] lower, since there will be silence; for the concave [part] of the hand, lacking a joint, is deprived of [any] distinct movement. But the wrist has the first movement from the attachment of the mount of the thumb to the thick part of the hand. Therefore, from there we will place a sound, because there is movement there; then [we will place] the second note on the exterior part at the base of the thumb where there is another movement distinct from the former; but [we will place] the

Nunc autem artem memorativam, hoc est per digitorum iuncturas litteras canendas cum vocibus hoc modo in palma collocamus. Non sine ratione ut Guido ad libitum sed cum maxima rei similitudine voces disponemus hoc modo: Sit concavum instrumenti in concavo manus, ubi silentium ponatur, quoniam ibi nulla vox fieri debet, eritque sicut terra. Deinde prima vox in restricta ponetur, sub qua gravior non sit ponenda, quia silentium erit; nam concavum manus carens iunctura motu caret distincto. Sed restricta motum habet primum ex applicatione montis pollicis ad pinguedinem manus. Inde igitur, quia motus ibi est, sonum locabimus; deinde secunda vox in radice pollicis in parte exteriori, ubi alius motus ab isto distinctus est; [tertiam] vero in alia iunctura pollicis exteriori, ubi motus etiam est distinctus; quartam vero in penultima exteriori eadem ratione. [Quintam] vero, quoniam maiores [convenientiam] habet cum prima quam ipsa quarta, in vertice pollicis ponemus conversam, idest

Aliam vero diapason hoc modo diponemus, ut similiter cum octava huius primae diapason scilicet tas ponamus primam sequentis scilicet psal in ipsius indicis radice et third note on the other joint [on the] exterior [part] of the thumb where there is also distinct movement; but [we will place] the fourth note on the penultimate exterior [joint] for the same reason. But since the fifth note has a greater correspondence with the first [note] than with the fourth, we will arrange it [so that it is] reversed on the top of the thumb—that is, looking back toward the first [note]. And this is [done] because that note and the other three [notes] that follow are of the same quality as the four preceding [notes]—that is, the diatessaron. And thus, we will place the sixth note on the following interior joint looking back downward, and likewise [in regard to] the seventh [note]. And thus the seven different [notes] will be arranged in a diverse manner. But the eighth [note], which is similar to the first [note] (although it is higher), will be placed at the base of the index finger, and since that finger is thinner than the thumb, it is clearly shown that the finer string renders the higher notes.

And we will arrange the other diapason in this method similarly so that we may place the eighth [note] of this first diapason—namely tas—with the first [note] of the
in secunda iunctura li, in tertia tur, at in summo per, a qua summitate usque ad digiti medii summitatem duas lineas prostrahemus taliter, quod videantur illi duo digiti alligati superius, et in summitate medii digiti ponemus vo conversam eadem ratione, qua de alia diximus. Sic et voces sequentes sequentibus iuncturis aptabimus, ita ut in radice ipsius medii digiti vox octava [collocetur] et in radice medici psal in unisono ponatur. Et idem fiat de alia diapason tertia cum auriculari, in cuius radice tas faciet finem, non quia ultra procedere ad acutiores non possit dicamus nec sub gravioribus alias posse remitti [negemus]; sed hoc dicimus, quia his tribus diapason satis est dilatata doctrina. Et in gravibus chordis vocis est modus, ut non ad taciturnitatem usque gravitas descendat, et in acutis ille custoditur acuminis modus, ne nervi, ut dicit Boetius, nimium tensi vocis tenuitate rupturant, sed totum sibi sit consentaneum atque conveniens. Totum hoc igitur subjecta patetfaciet figura. [Locus manus sequentis]

following [diapason]—namely psal—at the base of the index finger itself; and [we will place] li on the second joint, tur on the third [joint], but [we will place] per on the highest [joint]. From this apex, we will trace two lines up to the apex of the middle finger in such a way that those two fingers appear to be tied together above; and we will place vo [so that it is] reversed on the apex of the middle finger for the same reason that we have discussed concerning the other [note]. Thus also, we will adapt the following notes to the following joints in this manner, so that the eighth note will be arranged at the base of the middle finger itself, and [so that] psal may be placed in unison at the base of the ring finger. And let the same be done in respect to the other diapason—[that is], the third [diapason]—with the little finger upon whose base tas will mark the end, not because we are declaring that it cannot proceed beyond [this point] to higher [notes], and not because we deny that others can descend beyond to lower [notes], but we are declaring this because the doctrine is sufficiently explained with these three diapasons. And the limit of the sound is on the low strings, so that the
Hanc igitur figuram sic dispositam ita imaginamur, ut pollex per medium secetur quasi ad concavum manus et pars interior erigatur simul cum indice a medio disparato. Sic et medius super ligatura, quae utrosque per capita ligat, erigatur. Fiet, ut voces, quae litteris conversis signatae sunt, erectis figurentur. Medicus autem a latere medii stans erecte auricularem per caput convertet erigendo, ita ut radix eius in acumine sit. Et ita primis quindecim chordis sive vocibus similitudinem antiquorum demonstramus. Ideo ponimus eas in una erectione; sed illas octo, quas iungimus, ad perfectionem ibi iungimus denotandum, ut patet in figura. Sed de his hactenus. Nunc ad priores lowness does not descend all the way to silence; and that limit of highness is observed on the high [strings] so that, as Boethius says: "the strings may not be broken, having been stretched too much by the high pitch of the note but rather, [so that] everything may be agreeable and also suitable to itself." Therefore, the figure below will reveal all [of] this. The arrangement of the hand [should be placed] in the following space [See Figura 6].
species, quae prius dictae fuerunt, quoniam in illis tota vis pendet harmoniae, convertamus orationem.

fifteen] notes, we demonstrate a similarity to that of the ancients. Therefore, we place them in one ascending [arrangement], but those eight [notes] that we add, we add there for the purpose of indicating perfection, as it appears in the figure. But enough about these things! Now let us turn the oration to the previously mentioned species, since all the essence of harmony depends upon them.
Figure 27. Figura 6 of the Musica practica, 36.
Source: Johannes Wolf, ed., Musica practica, 47.
Animadverte, lector, quod unaquaeque species tot modis fiet, quot intervalla continet. Hoc ideo, quia semitonium, quod intervallum habet inaequale, per alia intervalla rotatur. Unde quandoque in primo, quandoque in secundo, aliquando vero in terto collocatur intervallo. Species vero, quae semitonium non tenet, unico modo fiet, etiamsi plura teneat intervalla, ut ditonus et tritonus unico semper fiunt modo.

Semiditonus vero, quoniam duo habet intervalla, unum scilicet toni et aliud semitonii, duobus modis fiet: uno, quando semitonium est in altiori intervallo, ut a c sive d f vel g b aut [h k] disiunctim et in istorum octavis; alio modo, quando semitonium est in inferiori intervallo, ut b d sive [e g] aut [h k] coniunctim et in istorum octavis.

But since the semiditone has two intervals—that is, one [interval] of a tone and another of a semitone—it will be made in two ways: (1) when the semitone is [found] within the higher interval such as a c or, if you prefer d f or g b or h k disjunct, and at their octaves; (2) when the semitone is [found] within the lower interval such as b d or, if you prefer e g or h k conjunct, and at their octaves.
Diatessaron, quia tria continet intervalla, duos tonos scilicet et unum semitonium, tribus fiet modis, quoniam quandoque semitonium est in medio ut a d et d g atque [g k] coniunctim et h l disjunctim et in eorum octavis. Et iste dicitur primus modus, quoniam ars Boetii incipit ibi. Secundus vero est, quando semitonium est in inferiori loco ut b e et e h, sic et h l coniunctim et in istorum octavis. Tertius modus est, quando semitonium est in altiori ut c f, f b, g k [disjunctim] et in istorum octavis.

Diapente vero quatuor modis fiet, quoniam quatuor continet intervalla, tres verum tonos unumque semitonium. Primus igitur modus habebit semitonium in secundo intervallo ut a e vel d h, sic et g l in coniuncto, h m in disjuncto et in eorum octavis. Secundus modus habebit semitonium in primo ut e h et h m in coniuncto et in istorum octavis. Tertius vero modus habebit semitonium in quarto intervallo ut f k disjuncto, b n et in suis octavis. Quartus vero modus habebit semitonium in tertio intervallo ut c g vel f k in coniuncto aut [g l] in disjuncto et in istorum octavis. Hoc in ordine

Since the diatessaron contains three intervals—that is, two tones and one semitone—it will be made in three ways, because at times the semitone is [found] in the middle such as a d and d g, and also g k conjunct and h l disjunct, and on their octaves. And this is called the first way, since the theory of Boethius begins there. But the second [way] is when the semitone is in a lower position such as b e and e h; likewise also h l conjunct, and on their octaves. The third way is when the semitone is in a higher [position] such as c f, f b, g k [disjunct] and on their octaves.

But since the diapente contains four intervals—that is, three tones and one semitone—it will be made in four ways. Therefore, the first way will have a semitone within the second interval such as a e or d h; likewise also g l in the conjunct, h m in the disjunct, and on their octaves. The second way will have a semitone within the first [interval] such as e h and h m in the conjunct, and on their octaves. But the third way will have a semitone within the fourth interval such as f k disjunct, b n, and on their octaves. But the fourth way will contain a semitone within the third interval such as c g or
intelligitur naturali, quoniam in accidentali ab unaquaque chorda ad aliam venientes diversas omnes quatuor possimus facere diapente. [Sic] et alias [38] species.

Sed ista ponimus, ne doctrina fiat confusa et cantus ecclesiasticus intelligatur, qui regulariter est ordinatus. Alii vero cantus potius lascivia quam venustate compositi numquam vel raro regulam servant, de qua paulo post loquemur. Prius tamen de omnibus speciebus loguamur, quae tredecim a multis esse putantur.

Species vero secundum Boetium est quaedam positio propria habens formam secundum unumquodque genus [in] uniusquisque proportionis consonantiam facientis terminis constituta. Scilicet ab aequalitate discedentes usque ad diapason per additionem semitonii fiunt. Prima igitur aequalis dicitur unisonus; post hanc minor quantitas est semitonium, deinde tonus, qui valet duo semitonia. Post hunc semiditionus, qui tria semitonii continet, tonum scilicet cum semitonio, et

\[ f \] \[ k \] in the conjunct or \( g \) \[ l \] in the disjunct, and on their octaves. This is understood in the natural order, since we can make all four types of the diapente in the accidental [order], advancing from any one string to another. Likewise, we can also do this with the other species.

We establish this so that the doctrine does not become confused, and so that one may understand the ecclesiastical song, which is ordered in a more regular way. But other songs (composed more licentiously than beautifully), rarely or never observe the rule which we will discuss a little later. Still, let us first discuss all the species, which are considered by many [people] to be thirteen.

According to Boethius, "A species is a certain position [of the notes] constituted between boundaries, having a unique form according to each genus, and producing a consonance in each and every one of the proportions." According to Boethius, "A species is a certain position [of the notes] constituted between boundaries, having a unique form according to each genus, and producing a consonance in each and every one of the proportions."134 Naturally, they are made by the addition of the semitone, starting from equality135 [and continuing] up to the diapason. Therefore, the first equal [interval] is called the unison; after this smaller quantity is the semitone; then the

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
sic deinceps: ditonus, diatessaron, tritonus, diapente, diapente cum semitonio, quae graeco nomine hexas minor, quoniam sex vocum capax est, et ultra diapente tantum habet semitonium. Diapente cum tono appellatur hexas maior vel hexachordum; habet etiam tonum supra diapente. Sic heptas minor et maior sive heptachordum, quia septem chordarum aut vocum est capax, diapente est cum semiditono et diapente cum ditono. Diapente cum diatessaron, quae ut diximus simul iuncta faciunt diapason. Ut igitur summatim dicam species, quibus omnis cantus regitur, haec tredecim esse putantur, videlicet: unisonus, semitonium, tonus, semiditonus, ditonus, diatessaron, tritonus, diapente, cum qua replicantur priores usque ad diatessaron, et isto modo compleetur ipsa diapason.

tone, which is worth two semitones. After this, a semiditone, which contains three semitones—that is, a tone with a semitone; and thus in succession: the ditone, the diatessaron, the tritone, the diapente, the diapente with a semitone, which [is called] by the Greek name hexas minor because it is capable of six notes, and it only contains a semitone beyond the diapente. The diapente with a tone is called hexas major or a hexachord; certainly it contains a tone above the diapente. Likewise, the heptas minor and the [heptas] major or, if you prefer, the heptachord, because each is capable of seven strings or notes; [the former] is a diapente with a semiditone and [the latter] is a diapente with a ditone. As we have said, the diapente joined together with the diatessaron produces the diapason. Therefore, so that I may speak summarily concerning the species by which all song is governed, these thirteen are considered to exist, namely: the unison, the semitone, the tone, the semiditone, the ditone, the diatessaron, the tritone, [and] the diapente, with which the previous ones [from the unison] up to the diatessaron are replicated; and in this way the diapason itself is completed.
Diceret tamen aliquis: quare dicimus diapente et diatessaron, quae simul iuncta compleant diapason? Num quid enim idem faciet ditonus cum hexade minori aut semiditonus cum maiori, sic et tonus cum heptade minori et semitonium cum maiori? Dicendum, quod verum est. Sed quia illae sunt partes maiores scilicet diapente et diatessaron, in quas ipsa diapason primo dividitur, dicitur diapason ex illis integrari. Nam qui bene inspexerint quantitatem chordae in prima figura $h a$: in medio aequaliter distat ab utraque $d$ et diatessaron cum $a$ et diapente resonat cum $h$. Est igitur tanta quantitas chordae diatessaron $d a$, quanta diapente $d h$. Igitur nimirum, si semper de illa quantitate diapason perfici dicatur, in quam prius dividitur.

Nevertheless, someone might say: Why do we say that the diapente and the diatessaron that are joined together complete a diapason? For will not a ditone with a hexas minor, or a semiditone with a hexas major produce the same thing? Likewise also, a tone with the heptas minor or a semitone with the heptas major? It should be said that [this] is true. But because those parts into which the diapason is first divided—that is, the diapente and the diatessaron—are larger, it is said that the diapason is completed from those [intervals]. For whoever will have examined properly the quantity of the string $h a$ in the first figure [may notice] that $d$ is equally distant in the middle from both, and that a diatessaron sounds with $a$ and a diapente sounds with $h$. Therefore, the quantity of the string is as much a diatessaron ($d a$) as it is a diapente ($d h$). Therefore, without doubt, if the diapason is said to be made perfect, it is always from that quantity into which it has previously been divided.

Sic et cantus in suo processu suavius procedit per illas voces, quae has species formant, quam per alias, ut paulo post dicetur. Non tamen arbitrentur aliqui ex hoc esse tantam quantitatem diatessaron in sono, [39] Likewise also, the song proceeds more agreeably on its own course through those notes that form these species than through others, as it will be discussed a little later. Nevertheless, no one thinks on account of this
Est tamen alia quantitas, quae quasi nihil differt in sono, in quam diapason dividet, ut puta tritonus et diapente imperfecta, quae vocatur semidiapente, ut b f et f 4, quoniam tanta distantia est inter b f, quanta inter f 4 nec differt practicorum differentia, secus tamen theoricorum, qui differentiam semitonii speculantur. In sono tamen non minus discors est quam ipse tritonus immediate considerata. Ideo non fecimus mentionem semidiapente. Loco enim tritoni accipitur in sono. Notanter tamen diximus immediate, quoniam, si per voces intermedias procedatur, tam in ascensu quam in descensu suavis est et lasciva ut f e d c b et e contra b c d e f. Non tamen debet cantus quiescere in f, quando ascendit, sed converti ad e. Sic et in descensu converti debet ad c. Tritonum facere, ut frater Johannes Carthusinus dicit, non est peccatum mortale, ut multi credunt. Immo necessarius est; nam alias non esset dare tertiam speciem diapente, quod esset manifeste falsum et contra veritatem. Loco etenim that the quantity of the diatessaron is worth as much in sound as the diapente, since, as it has been said, the diapente exceeds the diatessaron by a tone.

Still, there is another quantity into which the diapason can be divided, which hardly differs in sound [at all]: consider the tritone and the imperfect diapente which is called a semidiapente, such as b f and f 4, since there is as much distance between b [and] f as between f [and] 4; and to the performers there is no difference, nevertheless, [this is] not true of theorists, who speculate about the difference of the semitone. Yet, [taken] directly it is not considered [any] less dissonant in sound than the tritone itself. Therefore, we have not made mention [of] the semidiapente, for [its] place, in sound, is taken by the tritone. Nevertheless, note that we have said "directly," since it is gentle and expressive if it is advanced through intermediate notes in ascent as well as in descent, for example: f e d c b and in reverse b c d e f. Still, the song should not stop on f when it ascends, but [it should] be turned around toward e. Likewise also, in descent it should be turned around toward
suo necessarius videtur,
ut, si cantus ascendat,
hoc modo $f g a \flat c$ dulcior
ascensus est quam iste $f g$
$a b c$. In descensu tamen
contario modo; sed de his
hactenus.

As Brother Johannes Carthusiensis
says, "To make a tritone
is not a mortal sin as
many believe." On the
contrary, it is necessary,
for otherwise it would not
be possible to make the
third species of the
diapente, because it would
be manifestly false and
contrary to the truth.
Indeed, it seems necessary
in its own place, so that
if the song ascends in
this manner, $f g a \flat c$,
the ascent is sweeter than
[when the song ascends in]
this manner, $f g a b c$.
Nevertheless, in the
descent [it should be
done] in the opposite way;
but enough concerning
these things.

And now the species of
the diapason itself--on
which all the essence of
harmony depends--should be
discussed--[that is], how
many there are, what they
are, and in which way they
are arranged; and they are
called modes or, if you
prefer, tropes, or even
tones.

Nunc autem de speciebus
ipsius diapason, quot sunt
et quae et quo modo
disponuntur, dicendum est,
in quo tota vis pendet
harmoniae, et dicuntur
modi sive tropi aut etiam
toni.
Therefore, let us return to the species of music itself, which is said to contain the entire essence of harmony. Accordingly, it will be made into seven modes, since it is formed from eight notes containing seven intervals—that is, five tones with two semitones. It remains that the diapason itself should be changed into seven modes, because, if it is composed correctly from the diapente and the diatessaron, the diapente is made in four ways, and the diatessaron is made in three ways.

Therefore, so that we may begin, the first species [of the diapason] will be from proslambanomenos up to mese, which is divided into the diatessaron and the diapente, dividing the string in half by means of the lichanos hypatōn. Consequently, this species of the diapason will contain the first diatessaron a d with the first diapente d h, since the semitone of both is arranged on the second interval. The second species of the diapason will be from hypatē hypatōn to paramesē, which...
utriusque in primo [40] colloquotur intervallo, hoc est in inferiori. Tertia igitur species totius concentus fiet a parhypate hypaton in trite diezeugmenon, quae dividitur ut aliae in parhypaten meson. Habebit igitur tertiam species diatessaron et tertiam diapente, quoniam semitonium diatessaron in tertio colloquotur intervallo et diapente in [quarto]. Quartam vero speciem diapason facis a lichano hypaton in paraneten diezeugmenon dividendo per lichanon meson. Habebit igitur quarta species diapason primam diatessaron, sed quartam diapente, quoniam semitonium in tertio colloquotur intervallo et in hoc a prima specie satis cognoscitur differre. Verum si diapente fiat a lichano meson in nete synemmenon, idem erit quod prima nec aliqua est differentia, quoniam semitonium erit in secundo intervallo sicut in prima; et quia diatessaron omnino similis est, relinquitur nullam esse differentiam inter has species sic dispositas, nisi quis dicat eas differre, quia diapente primae speciei fit a linea in lineam ut d h et diapente quartae a spatio in spatium ut g l. Ista etenim cognitio nulla est, quoniam linea vel spatium non arquit [differentiam] in musica, ut frater Johannes is divided by a string that is segmented equally in the middle by means of the hypatē mesōn. Therefore, [this second species] will contain the second diatessaron—that is, b e—and the second diapente—that is, e ἵπ—since the semitone of both is arranged on the first interval—that is, on the lowest [interval]. Then, the third species of all harmony will be made from parhypatē hypatōn to tritē diezeugmenōn, which is divided as the others on parhypatē mesōn. Therefore, [the third species] will contain the third species of the diatessaron and the third [species] of the diapente, since the semitone of the diatessaron is arranged on the third interval and [the semitone] of the diapente [is arranged] on the fourth [interval]. But you make the fourth species of the diapason from lichanos hypatōn to paranētē diezeugmenōn, dividing [it] by means of the lichanos mesōn. And the fourth species of the diapason will contain the first [species of] the diatessaron, but the fourth [species of] the diapente, since the semitone is arranged on the third interval; and in this way it is understood to differ enough from the first species. Truly, if the diapente is made from lichanos mesōn to netē synēmmenōn, it will be the same as the first.
Carthusiensis conatus est probare fuisse solum quindecim nervos ab antiquis positos propter hoc, quod a re et a la mi re secundo in spatio collocantur; sic et reliquae chordae, quae post a la mi re veniunt, simili modo respondent. Nam si sic tertia species diapentis similis esset primae et quarta secundae, quoniam eodem modo lineas vel spatia tenent, non ergo dissimilis primae, sed eadem est quarta species diapentis, si sumat tetrachordum synemmenon. Hoc etenim modo chordam dividentes medio quatuor species diapason facimus differentes nec plures esse poterunt. [species], and there is not any difference, since the semitone will be on the second interval just as it was in the first [species]; and because the diatessaron is similar in every way, there remains no difference between these species that are arranged in this manner except that someone may say that they differ because the diapente of the first species is made from line to line, such as d h, and the diapente of the fourth [species is made] from space to space, such as g l. And indeed, this knowledge is worthless, since the line or space does not show the difference in music, as Brother Johannes Carthusiensis tried to prove: "There were only fifteen strings placed by the ancients, and it was on account of this that a re and the second a la mi re are arranged on a space; likewise also the remaining strings that come after a la mi re correspond in a similar manner." For thus, if the third species of the diapente were similar to the first, and the fourth [species of the diapente] were [similar] to the second--since they occupy lines or spaces in the same manner--then the fourth species of the diapente would not be unlike the first, but would be the same if it took the synēmmenōn tetrachord. For in this
Verum si [chordam] non per medium sed per tria dividamus, alias quatuor differentes faciemus, non quod omnino differant, sed quia diatessaron erit supra diapente et non inferius, ut quinta a lichano hypaton in paraneten diezeugmenon; quoniam diapente erit eadem, quam tenuit prima, supra ipsam intendatur diatessaron, et sat is in hoc a prima differre videbitur. Sexta vero [diapason] erit ab hypate meson in neten diezeugmenon, quae diapente habebit eandem, quam habuit secunda, diatessarongque similiter, sed intensam supra diapente; et in hoc differat ab ipsa secunda. Septima vero species diapason fiet a parhypate meson [in] trite hyperboleon sumens diapente, quam tenuit tertia, intendensque supra ipsam diatessaron. Octavam facimus hoc modo: a lichano meson intendimus diapente eandem, quam tenuit quarta, in paranete diezeugmenon, supra quam intendimus primam diatessaron in paranete hyperboleon. Si autem sumat synemmemon, erit sicut quinta. Propter hanc igitur differentiam coniuncti scilicet et disiuncti additur species

But if we do not divide the string in half, but rather into three parts, we will produce another four different [species]; not because they differ altogether, but because the diatessaron will be above and not below the diapente, as [when] the fifth [species is made] from lichanos hypaton to paranete diezeugmenon. Since it will be the same diapente that the first [species] held, let the diatessaron be laid above it, and it will appear to differ enough in this way from the first [species]. Indeed, the sixth [species] of the diapason will be from hypate meson to nête diezeugmenon, which will contain the same diapente that the second [species] held, and similarly the same diatessaron, but laid above the diapente; and in this way it differs from the second [species]. But the seventh [species] of the diapason will be made from parhypate meson to trité hyperbolaión, taking the diapente that the third species held and laying it above the same diatessaron. We make the eighth species in this way: from lichanos meson we lay the same diapente that the fourth [species]
diapason octava. Quomodo autem ex his speciebus modi sive toni proveniant, nunc disseremus.

held to paranētē diezeugmenōn, above which we lay the first diatessaron to paranētē hyperbolaïōn.\textsuperscript{143} However, if it takes the synēmmenōn, it will be like the fifth [species]. Therefore, on account of this difference of the conjunct and the disjunct [tetrachord], the eighth species of the diapason is added. However, now we will discuss how the modes or, if you prefer, the tones may arise from these species.
Ex diapason igitur speciebus, ut ait Boetius existunt qui appellantur modi, quos eosdem tropos vel tonos nominant. Sunt enim tropi constitutiones in toto vocum ordinibus vel gravitate vel acumine differentes. Constitutio vero est veluti modulationis corporis ex consonantiarum conjunctione consistens. Appellat enim Boetius hos modos nomine proprio distinctos. Unde dicit ipsa: quo enim unaquaque gens gaudet, eodem nomine nuncupatus est, ut dorius, quia Dorici eo gaudebant, sic appellatus est et ex prima specie diapente et prima specie diatessaron intensa supra diapente constat, scilicet d h et h l, quam diapason in quarto loco locatum diximus esse. Cum autem haec diapente habet sub se diatessaron remissa, iones d a, appellatur hypodorianus, quia sub dorio collocatus est. Secundam vero speciem diapente cum secunda diatessaron intensa ut e f g m, appellat phrygium, quia apud Phrygios erat in usu. Sin vero secunda species diapente secundam sub se remittat diatessaron, hypophrygius dicitur ab ipso ut e f e b

Therefore, as Boethius says, from the species of the diapason arise what are called modes. They are also called tropes or tones. Certainly there are compositions of the trope in all the orders of the notes that differ either in lowness or in highness. But the constitution is as the body of the melody, existing within the conjunction of the consonants. For Boethius calls these distinct modes by a particular name. Whence, he himself says: "For in whatever [mode] a particular people finds pleasure, by that same name [the mode] is called," for example: Dorian because the Dorians delighted in it; thus it was called and consists of the first species of the diapente and the first species of the diatessaron placed above the diapente —that is, d h and h l— which we have said is the diapason arranged on the fourth position. However, when this diapente has the diatessaron placed below it—that is, d a— it is called Hypodorian, because it is arranged below the Dorian. But the second species of the diapente
diatessaron remissa.
Tertiam vero diapente cum tertia diatessaron intensa appellat lydium, quod in Lydia, unde Tusci trahunt originem, maiori cum gaudio frequentabatur ut f k diapente, k n diatessaron intensa. Quod si diatessaron non supra sed infra tenuerit hypolydius nominabitur ratione praedicta ut f k diapente, f c diatessaron. Quarta vero diapente species cum prima diatessaron intensa caret nomine proprio. Sed quia iuxta lydium proposita est mixolydius est appellatus ut g l diapente intensa, l o diatessaron intensa. Quod si diatessaron supra se non intenderit, sed sub se remiserit hypermixolydius est nuncupatus ut g l diapente, [g d] diatessaron remissa.

with the second [species] of the diatessaron placed above he calls Phrygian, such as e f k m, because it was in use among the Phrygians. However, if the second species of the diapente yields the second [species] of the diatessaron below, such as [the diapente] e f k with the diatessaron e b placed below, he calls Hypophrygian. And the third [species] of the diapente with the third [species] of the diatessaron placed above, such as the diapente f k with the diatessaron f c, it will be called Hypolydian for the reason mentioned before. And the fourth [species] of the diapente with the first [species] of the diatessaron placed above lacks its own special name. But since it was placed next to the Lydian, it is called Mixolydian, [and] the diatessaron l o is placed above the diapente g l. But if the diatessaron is not placed above but below, it is called Hypermixolydian, such as the diapente g l with the diatessaron g d placed below.
Propter hanc igitur conformitatem tam in re quam etiam in nomine Graeci et etiam nostri antiqui tantum quatuor esse dicunt modos, quia species diapente quadruplex est. Et sic prima species appellatur protus graece, quod latine primus interpretatur; secunda deuterus graece, latine secundus; tertia tritus graece, latine tertius; quarta [tetrardus] graece, latine quartus.

Quando igitur protus diatessaron habet supra se, dicitur protus auctenticus, idest primus auctoralis sive magister. Sed si diatessaron sub se recipit auctentica carens elevatione, plagis proti nuncupatur idest collateralis vel discipulus, ut dicunt moderni. Quod si utrumque habuerit, mixtus dicetur. Sic et de aliis tribus intellige. De hac tamen mixtione nunc superficie tenus dicimus, quoniam tantum de ipsius diapason speciebus tractamus, ex quibus illi octo proveniunt toni. Quando vero isti toni suam quisque implet diapason, singuli perfecti sunt. Si vero deficient, sunt imperfecti; si superabundant, superflu.

Therefore, on account of this conformity (as much in theory as in name), the Greeks and also our ancient writers say there are only four modes, because the species of the diapente is fourfold. And thus, the first species is called protus in Greek, which translates as primus in Latin; the second [species is called] deuterus in Greek, secundus in Latin; the third [species is called] tritus in Greek, tertius in Latin; [and] the fourth [species is called] tetrardus in Greek, quartus in Latin.

Therefore, whenever the protus has the diatessaron placed above [the diapente], it is called protus auctenticus,147—that is, "the first of authority" or, if you prefer, "the master." But if the diatessaron retreats below, lacking the authentic elevation, it is called plagis proti,148—that is, as the moderns say, "the collateral" or "the disciple." But if it possesses both, it will be called "mixed." Thus also, one can apply this to the other three [modes]. Nevertheless, now we speak superficially [and] only up to a certain point concerning this mixture, since we only treat the species of the diapason itself from which those eight tones arise. And when each of these
Non autem sunt plusquamperfecti, ut Ugolinus asserit et Johannes de Muris, quem ipse nimium laudat, ac Marchetus reprobatus a fratre Johanne. Ego enim dico tonum, qui implet suam diapason nec plus nec minus, esse perfectum. Qui autem excedit vel deficit, imperfectus est superfluitate aut diminutione. Istopem octo modos moderni sic appellant, ut protus auctenticus dicatur primus, eius plagalis secundus, deuterus auctenticus tertius, plagalis quartus, tritus auctenticus quintus, eius plagalis sextus, tetrardus auctenticus septimus, eius plagalis octavus.

Sed videndum nobis est, quomodo tropus sive modus intelligatur, utrum scilicet simpliciter intendendo diapente, intendendo vel remittendo diatessaron, vel a prima voce idest ab inferiori usque ad superiorem per omnes intermedias vel alio
tones completes its diapason, each [of them] is perfect. But if they are wanting [in any way], they are imperfect; if they are overabundant, they are superfluous.

However, there are no pluperfects as Ugolino, [and] Johannes de Muris (whom the master [Guido] praises excessively), and also Marchettus (who was refuted by Brother Johannes) claim. For I say that a tone which completes its own diapason, neither more nor less, is perfect. However, that which exceeds or is wanting is imperfect by [its] superfluity or by [its] diminution. For the moderns name those eight modes in the following manner: the authentic protus is called first, its plagal [is called] second; the authentic deuterus [is called] third, its plagal [is called] fourth; the authentic tritus [is called] fifth, its plagal [is called] sixth; the authentic tetrardus [is called] seventh, [and] its plagal [is called] eighth.

But we should observe how the trope or, if you prefer, the mode is perceived—that is, whether or not one should proceed in the song by simply placing the diapente above, placing the diatessaron above or below, or [proceeding]
quodam modo sit procedendum in cantu, quoniam, sicut quatuor differentes posuimus, ita in cantu differentiam teneant, erit necesse.

Qualitas enim unius in modum historiae recto tranquilloque fertur in cursu. Alter vero anfractibus et saltibus concinitur, alter garrulus. Alius autem severus in sublime vocem extollens audientium animos elevat, alter vero placidus [laetitiam] indicans morum. Ex quo notandum est, quod musicus motus ab ipso modo proto scilicet vel deuteru aut alio qualitatem trahit et differentiam. De his ergo singulatim dicendum est.

from the first tone— that is, from the lower [tone] up to the higher [tone]— through all the intermediate [tones]— or by another manner, since just as we have placed four different [species], so it will be necessary that they maintain a difference within the song.

For traditionally, the quality of one is sung on a straight and tranquil course. Another is sung with intricacies and leaps, and yet another is sung in a speech-like manner. One is serious, lifting the voice on high [and] raising the souls of the listeners, but another is gentle, indicating a joyfulness of character. Accordingly, it should be noted that the musical affection draws out [its] quality and difference from the mode itself— that is, from protus or deuterus, or from another mode. Therefore, these things should be discussed individually.
CAPITULUM TERTIUM

IN QUO MUSICAEE MUNDANAEE,
HUMANAEE AC INSTRUMENTALIS
PER TONOS CONFORMITAS
OSTENDITUR

[43] Indeed, this musica instrumentalis has the greatest conformity and similitude with musica humana and musica mundana. Certainly, with musica humana in this manner: for those four modes influence the affections of man. Whence, the protus [mode] is the master of phlegm, but the deuterus [is the master] of choler, the tritus [is the master] of blood, and the slower, more sluggish tetrardus [is the master] of melancholy. The protus mode stirs up phlegm, awakening one from sleep; thus its appearance is depicted with a crystal color, since the crystalline sky is said to have been made from the waters--an element which creates phlegm. But we maintain that the color is that of crystal and not the color of other waters, because not all men are capable of weighing carefully the gentle sound of the phlegmatic. But when men of genius and those who are as transparent as crystal, who due to either food or intoxication, or some

Ista etenim musica instrumentalis maximam habet conformitatem et similitudinem cum humana mundanaque. Cum humana quidem hoc modo: nam quatuor illi modi quatuor complexiones hominis movent. Unde protus flegmati dominatur, deuterus vero colerae, tritus sanguini, tetrardus autem segnior et tardior melancholieae. Protus ipse modus flegma movet a somno excitando et sic eius figura colore cristalino depingitur, quoniam coelum cristalinum ex aquis fertur esse factum, quod elementum flegma creat. Sed ponimus cristalinum et non aliarum aquarum colorem, quia non omnes homines flegmatici sonum suavem perpendere valent. Sed viri ingeniosi et sicut cristallum perspicui, qui, cum alienquantum aut cibo sive crapula aut aliquo alio extrinsecus accidenti flegmate gravantur, soporem aut aliquam pigritiem inducente vel tristitiam proto modo personante alleviantur. At vero suus plagalis contrario modo se habet. Nam primus tonus, ut dicit

other outward cause become somewhat oppressed with phlegm (which induces drowsiness, or some laziness or sadness), they are lifted up by the protus mode resounding. But certainly, its plagal conducts itself in the opposite way. For the first tone, as Lodovicus of Sanchez says, \textsuperscript{151} "is quick and suitable for all affections,"--that is, it is desirable [for such music] as in the canticums.\textsuperscript{152} But the second [mode] is grave and tearful; it is especially appropriate for both the miserable and the lazy, as in the dirges and lamentations of Jeremiah. For we do not doubt that drowsiness arises from sadness on account of the affection of phlegm. Whence that [saying]: "Their eyes were heavy from sadness." However, it was customary for the Pythagoreans, when they [wished to] release [their] daily cares in sleep, to employ the Hypodorian in order that gentle and quiet slumber might creep upon them. But awakened by the Dorian, they purged the stupor and confusion of sleep, knowing without a doubt, as Boethius says, that "the whole structure of our soul and body is united by means of musical harmony."\textsuperscript{153} And just as the affection of the body conduct itself, thus also the pulses of the heart

The deuterus mode inspires anger, exciting and provoking [men] toward wrath. For that reason, it is depicted with the color of fire, because it is severe and swift in its course, having bolder leaps, as we will discuss in its proper place. This tone corresponds the most to arrogant, wrathful, exalted men—the harsh and the cruel—and they rejoice in it. Concerning this, Boethius affirms: "Those who are harsher, such as [the men] of Getae, are delighted by the rougher modes; but those who are gentle [are delighted] by the moderate [modes]." Boethius relates that a young man of Tauromenium was so excited by this tone that he was ready to break down the doors of a brothel, but he was sedated with the Hypodorian [mode]. But its plagal— that is, the fourth tone— is described as "flattering, talkative," corresponding especially to those who flatter, because they charm people with flattering words in their presence but sting them in their absence. Thus, this tone seems to be licentious without [any] beauty; nevertheless, at times, according to the mixture, it [can be] exciting.
Tritus autem tropus auctenticus sanguinis dominium obtinuit. Ideo tonus iste a beato Augustino dicitur delectabilis, modestus et hilaris, tristes et anxios laetificans, lapsos et desperatos revocans. Ideo sanguineo colore depingitur. De hoc dicit Boetius, quod Lydii, qui maxime iucundi sunt et laeti, hoc delectantur et praesertim eorum mulieres, a quibus Russi exorti dicuntur, qui maxime choreis et saltationibus oblectantur. Eius vero plagalis est pius, lacrimabilis, conveniens illis, qui de facili provocantur ad lacrimas, quia voces habet maxime coadunatas, ut dicetur in eodem.

Moreover, the authentic tritus trope maintained dominion over blood. For that reason, this tone is described by the blessed Augustine as "delightful, modest, and joyful, cheering the sad and the anxious, calling back the stumbling and the lost." Therefore, it is depicted by the color of blood. Concerning this [matter], Boethius says that the Lydians, who are especially cheerful and joyful, are delighted by this [mode], especially their women. The Russians, who are greatly amused by [their] choral and leaping-style dances, are said to have originated from them [the Lydians]. But its plagal is pious, lamentable; appropriate to those who are easily inclined to tears, because it has the most harmonious sounds, as it will be discussed later.

Tetrardus vero auctenticus partem habet lasciviae et iucunditatis partemque incitationis varios habens saltus et mores adolescentiae repraesentans. Ideo melancholiae dominium tenet, quandoque scilicet resistens, quandoque vero adaugens et hoc secundum commixtionem, quam cum aliis facit, ut paulo post dicetur. Propterea luteo colore semicristalino depingitur. Plagalis vero eius suavis et moratus atque morosus secundum

But the authentic tetrardus [mode] has a side of frivolousness and of joyfulness, and a side of excitement, possessing various leaps and representing the character of adolescence. Therefore, it maintains dominion over melancholy—that is, sometimes resisting and sometimes increasing; and this [is] according to the mixture that it makes with the others, as it will be discussed a little later. For this reason, it is depicted by a yellowish
modum discretorum, ut
Ambrosius refert. Movent
igitur septimus et octavus
melancholiam modulo suo
tristes homines atque
remissos ad medium
adducendo, videlicet
auctenticus incitando,
plagalis vero
[laetificando].

Ex his igitur patet
musicae instrumentalis et
humanae convenientia.
Quod autem musica mundana
cum instrumentalibus maxime
habet conformitatem, patet
habita Tullii
comparatione. Nam a
proslambanomeno usque ad
mesen disponitur ordo
planetarum cum firmamento,
ita ut Luna sit
proslambanomenos,
Mercurius hypate hypaton,
Venus parhypate hypaton,
Sol lichanos hypaton, Mars
hypate meson, Jupiter
parhypate meson, Saturnus
[45]
lichanos meson, coelum
stellatum mesè.

Si igitur Luna
proslambanomenos, Sol vero
lichanos hypaton, liquet
istos duos planetas in
diatessaron specie cantus
collocandos atque ideo
Lunam hypodorium, Solem
vero dorium modum tenere.
Ex quo liquido constat
Lunam flegmatica et humida

color with a hint of
crystal. But its plagal,
as Ambrose relates, "is
gentle, mannered, and
slow," in the manner of
distinguished [men].
Therefore, the seventh and
eighth [modes] arouse
melancholy with their
melody by leading sad and
dejected men to a more
moderate mood; clearly the
authentic excites, the
plagal gladdens.

Accordingly, from these
things, the correspondence
between musica
instrumentalis and musica
humana is clear. However,
it is clear from the
comparison conducted by
Tullius that musica
mundana holds the greatest
conformity with musica
instrumentalis. For the
order of the planets and
the firmament is arranged
from proslambanomenos up
to mesè in such a manner
that the moon is
proslambanomenos, Mercury
is hypatè hypatôn, Venus
is parhypatè hypatôn, the
sun is lichanos hypatôn,
Mars is hypatè mesôn,
Jupiter is parhypatè
mesôn, Saturn is lichanos
mesôn, [and] the starry
sky is mesè. 

Therefore, if the moon
is proslambanomenos, but
the sun is lichanos
hypatôn, it is evident
that these two planets
should be arranged on the
diatessaron species of the
song; and therefore, the
moon holds the Hypodorian
mode, but the sun holds

Mercurius vero hypophrygium reget. Nam iste modus adulatorum est, qui viciosos et sapientes probosque aequo modo collaudant et ad utramque partem facile convertuntur, hoc est ad lamentum et ad laetitiam, the Dorian. Accordingly, it is well known that the moon increases the phlegm and humidity of man, but the sun dries up that very humidity and phlegm. Therefore, these two planets—since they are principals and luminaries—govern the first mode along with the second [mode]—that is, the authentic protus and the plagal of the protus. Indeed, the Dorian (the first of the authentic [modes]), is properly compared to the sun, because it has pre-eminence among all the modes just as the sun [has dominion over] all the planets. For all the terrestrial exhalations and the vapors of the sea are raised by the solar rays, from which the meteoric assaults are created. Therefore, the correspondence between the sun and the moon is clear: the latter shines in the night, the former flees the night; the Hypodorian induces sleep, but the Dorian banishes it. Consequently, they agree both in location and in conformity with the consonance of the diatessaron.

And Mercury will govern the Hypophrygian. For this is the mode of the flatterers, who praise both the wise, honorable men and the corrupt equally, and who are easily turned to either direction—that is, to
Mixolydianus vero attribuitur Saturno, quoniam circa melancholiam versatur. Hypermixolydianus vero totaliter ponitur lamentatione et ad gladness, to excitation and to sedation. Such is the nature of Mercury, who is good with good people and extremely bad with bad people. But Mars, who is entirely full of anger and wrath, is master of the Phrygian [mode]; for he tries to destroy all that is good in the world with his wrath. Therefore, Mercury, united with him, is just as bad (or at least in a certain respect), as Mars himself. For the former wounds with the sword, but the latter with the tongue.

But the Hypolydian is attributed to Venus herself, who is fortune; nevertheless, it is feminine because sometimes it moves one to pious tears. But the Lydian is properly compared to Jupiter, of greater fortune, who creates sanguine and benevolent men [of] gentle and pleasant [disposition], since [this mode] always denotes [the quality of] joy. Its correspondence is with Venus, harmonizing on the diatessaron and in good fortune, and they do not differ except in the difference of the sounds. For the lower sound is not as sweet nor as gentle as the higher sound.

But since the Mixolydian deals with melancholy, it is attributed to Saturn. However, the Hypermixolydian is
castalinus, quoniam coelo attribuitur stellato sive firmamento. Nam hic modus super omnes alios habet quandam insitam dulcidentem cum venustate et immunis est ab omnibus qualitatibus et omni negotio conveniens. Guido et Odo dicunt ipsum gloriam repraesentare nec multum descendunt ut dicunt: per septem aetates discurrentes laboramus, in octava vero requiem ab omnibus laboribus expectamus.

Ex his ergo patet musicae humanae et mundaneae cum instrumentali conveniencia. Sed hoc superficie tenus dictum est, in secundo enim et tertio libro multa sumus dicturi. Haec autem hic posuimus, ut interim animum lectoris assuefaciamus et illi ignorantiam negationis auferamus. Patet igitur ex dictis comparisonibus et auctoritatebus unumquemque tonum diversam ab altero qualitatem habere.

Quod si adhuc idem certius probare libet auctoritate et comparatione per id, a quo musica traxit originem, ut established entirely in the realm of the divine, since it is attributed to the starry sky or, if you prefer, to the firmament. For this mode, above all others, has a certain innate sweetness coupled with beauty, and it is devoid of all the qualities that correspond to every worldly affair. Guido and Odo say that it represents glory, and they do not yield much when they say: "We toil, running about through seven ages, but in the eighth we expect rest from all [our] labors."

Therefore, the correspondence of musica humana and musica mundana with musica instrumentalis is clear from these things. But this has been discussed superficially; truly we will have much [more] to say [about it] in the second and the third book. However, in the mean time, we have placed this [discourse] here in order that we may accustom the mind of the reader [to these things] and remove from him the ignorance of negation. Therefore, it is clear from the comparisons and authorities discussed that each tone has a quality which distinguishes it from another.

But if, in addition, it is agreeable to prove the same with greater certainty than through authority and comparison.
Hesiodo placet, musas novem filias Iovis et memoriae taliter disponemus, ut eam, quae bella narrat, Marti tradamus et sic tono phrygio, ita et eam, quae tragoedias sive caedes commemorat, Saturno ac per hoc mixolydWO, quae vero laetitiam indIcat, Veneri. Et sic unamquamque musarum locis debitis collocabimus secundum Martiani et Macrobii auctoritates. Sic et unici
cum versum imponemus, per quem convenientia cum musica denotetur. Disponemus ergo eas sic, ut Thalia silentium teneat sicut Terra. Deinde Clionem Lunae attribuemus, sed Calliopen Mercurio dicabimus ac Terpsichoren Veneri affigemus. Melpomenen Sol decolorabit, Erato Martem incitabit, [Euterpen] Jupiter benevolam facit et laetam, Polyhymniam vero Saturnus contristat. Ultimae vero Euraniae coelum stellatum dabit decorem ac requiem. Cum igitur a prima idest a silentio ad ultimam circulum facimus et ad secundam totum concentum remittentes recurrimus, hypodorium procreamus. Quemadmodum igitur de istis fecimus, de reliquis faciendum esse arbitramur, ita quod spiras facere non cessemus, donec ad ultimam musam perveniamus, a qua superflua, si fiat, erit intentio, quoniam replicatio prioris est, ut Rogerius Caperon asserebat then by means of that from which music has drawn [its] origin—as Hesiod prefers to do—we will arrange the nine Muses, daughters of Jupiter and the goddess of memory, in such a way that the one who relates wars is entrusted to Mars and thus, to the Phrygian tone; likewise also [let us entrust] the one who relates tragedies or, if you prefer, massacres to Saturn, and by this means to the Mixolydian [tone]; but [let us appoint the one] who values gladness to Venus. And thus we will arrange each one of the Muses in their proper places according to the authorities of Martianus and Macrobius. Likewise also we will assign a verse to each one by which a correspondence with music may be indicated. Therefore, we will arrange them so that Thalia will hold silence just as the earth. Then we will attribute Clio to the moon, but we will dedicate Calliope to Mercury, and then we will assign Terpsichore to Venus. The sun will bronze Melpomene, Erato will stimulate Mars, Jupiter makes Euterpe benevolent and glad, but Saturn makes Polyhymnia sorrowful. And the starry sky will give glory and rest to the last Muse, Urania. Therefore, when we make a circle from the first—that is, from silence—to the last, and
esse crisim vocem illam
supra nete hyperboleon
additam et coruph, quae
sub proslambanomeno. Ipse
et enim, credo, in die
[haeretico] artem totam
composuerit, et cum ad
coruph pervenit, ipse cum
tota corruit. Namque
probatum est istam musam
silentium, aliam vero
ultimam vocem altiorem
tenere. Nos vero caveamus
ab antiquitate auctore
tenere. Nos vero caveamus
ab antiquitate auctore
aliquid transvertere.
Erit igitur prior vox
proslambanomenos, ultima
vero nete hyperboleon, in
quorum omnium exemplum
subscriptam subiecimus
figuram.

when we return to the
second [mode]—lowering
the whole concentus—we
produce the Hypodorian.
Therefore, just as we have
done with these things, we
think it should be done
with the rest in such a
manner that we will not
stop making spirals until
we arrive at the last
Muse. [And] if this is
done, there will be a
superfluous stretching,
since there is a
replication of the first,
as Roger Caperon claimed
that the note crisis
[should be] added above
nētē hyperboleon and [the
note] coruph [should be]
added below
proslambanomenos. Indeed,
I believe he composed all
[his] art in a heretic
day, and when he arrived
at [the concept of]
coruph, he was destroyed
with all his art. For it
has been proven that this
[first] Muse occupies
silence, but that another
--the last [Muse]--
occupies the highest
sound. But let us take
care to carry over
something of antiquity
from the author.
Accordingly, the first
sound will be
proslambanomenos, but the
last [sound] will be nētē
hyperboleon. [And] we
have presented the figure
written below as an
example of all of these
things [see Figura 7].

Therefore, it is clear
from this arrangement of
the figure why they have

Primum tamen quaedam omnibus generalia, per quae cantus possit cognosci, incognitus si sit, corrigi, si minus bene compositus exstat et been called tropes, namely, because one is naturally produced from another. For the order of these things proceeds in such a manner that if one raises the first species of the diapason from proslambanomenos to mesé—including those middle notes which are enclosed by the extremes—into the high [range] by a tone, and stretch the hypatē hypatōn by the same tone [in order to] make all the rest higher by a tone, the entire series will become higher than it was before it submitted to the raising of the tone. Therefore, the entire arrangement—once it has been made higher—will be the Hypophrygian mode, and certainly in the others the process into the high [range] and [of] elevation is similar. Consequently, they were not called tropes, because beginning on the low notes they transfer themselves to the high notes, and returning to the end they finish on the low [notes], as Saint John preferred to do.164 For there are some that do not begin on the low, but rather on the high [notes], as we will discuss a little later, treating each one [of them] individually.

Nevertheless, for the benefit of everyone, let us first discuss certain generalities, by means of which the song can be learned if it is not

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
known, corrected if it appears improperly composed improperly, and we can learn how to properly compose another [song] anew.
Figure 28. Figura 7 of the Musica practica, 47.
Source: Johannes Wolf, ed., Musica practica, 61.
SECUNDÁ PARS
IDEST CONTRAPUNCTUS
TRACTATUS PRIMUS
CAPITULUM PRIMUM
IN QUO NOTITIA
CONSONANTIUM VOCUM ET
DISSONANTIUM PONÍTUR

Taliter hucusque prosecuti fuimus, ut tantum de vocibus successive prolatis aliqua loqueremur. Nunc autem, quae illarum duae simul pluresve percussae sive cantatae consonent vel dissonent, breviter explicetur. Qualiter autem consonantia aut dissonantia aurem ingrediatur et utrum vera sit Platonis opinio aut Nicomachi, quoniam speculativa est, in secundo libro iuxta ingenii nostri vires declarare et diffinire conabimur. Nunc autem, quoniam practicos paulatim ad doctrinam hanc attrahere procuramus, breviter et quasi per modum corollarii ea, quae ad practicam pertinent, explicemus.

Dictum est totum corpus musicae unam esse diapason, quae vocibus octo constat. Si igitur has octo voces invicem

SECOND PART
THAT IS, COUNTERPOINT
FIRST TREATISE
FIRST CHAPTER
IN WHICH A KNOWLEDGE OF THE CONSONANT AND DISSONANT NOTES IS ESTABLISHED

Up to this point, we have proceeded in such a manner that we have only spoken to some degree of the notes written in succession. Now it will be briefly explained which of those two or more [notes] sound consonant or dissonant when they are plucked or sung at the same time. However, since it is speculative, in the second book we will try to explain and define according to the powers of our intellect how consonance and dissonance enter the ear, and whether or not the opinion of Plato or Nicomachus is true. But now, since we endeavor to gradually attract the practicing musicians to this teaching, we will briefly, and as if by way of a corollary, explain that which pertains to practice.

It has been said that the entire body of music is [made up of] a single diapason that consists of eight notes. Therefore,
referendo declaremus, sufficiet. Per modum igitur doctrinae sciæ, voces aequales concordare, idest unisonum. Secunda dissonat cum prima, tertia consonat primae, quarta sola cum prima discordat. Concordat autem quinta et sexta, septima discrepat, aequisonat per optime octava. Quemadmodum igitur fecimus ad primam omnes alias referendo, sic ad secundam et tertiam et ad reliquas, ita ut tertia dissonet cum secunda, quarta vero consonet; et ita de ceteris hoc modo ratus ordo monstrabit.

Ut autem inconsonum sciamus evitare, consonum vero eligere, dicemus discrepantes voces esse tres, videlicet secundam, quartam, septimam; secunda vero maior aut minor, quia tonus aut semitonium; quarta similiter, quia diatessaron aut tritonus; septima eodem modo, quia heptas maior aut minor. Sed concordantes sunt unisonus, tertia, quinta, sexta, octava. De unisono it will suffice if we explain these eight notes in relation to one another. Accordingly, by means of [our] teaching, you may know that the equal notes—that is, the [notes of the] unison—agree. The second [note] is dissonant with the first, the third is consonant with the first, [and] the fourth alone is discordant with the first. However, the fifth and sixth [notes] are concordant [with the first], the seventh is dissonant [with the first], [and] the eighth sounds equal in the most perfect way. Therefore, just as we did to the first [we should do] in relation to all the others: thus to the second and the third, and to the rest, so that the third sounds dissonant with the second, but the fourth sounds consonant; and thus the established order will serve as an example concerning the rest in this manner.

However, so that we may know how to avoid dissonance and to choose consonance [instead], we will say that the disagreeing voices are three, namely: the second, the fourth, [and] the seventh; indeed, the major and minor second, because [it is either] a tone or a semitone; similarly the fourth, because [it is either] a diatessaron or a tritone;

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Est tamen unisonus in musica sicut unitas in arithmetica praeermissum numerorum, fons et origo consonantiarum. Unisono igitur praetermisso dicemus species concordantes quatuor esse, scilicet: tertia, quinta, sexta, et octava. Perfectae, quinta scilicet et octava, imperfectae vero tertia et sexta. Imperfectae enim dicuntur, quoniam variabiles sunt, quia per additionem semitonii vel [and] the seventh for the same reason, because [it is either] a major or minor heptas. But the concordant voices are the unison, the third, the fifth, the sixth, [and] the octave. Moreover, there is no doubt for anyone concerning the unison, since the same does not differ from itself. For that reason, it is not reckoned among the consonances, because a consonance is not a concord of similar things but of dissimilar things made into one or, a sound of dissimilar things mixed and put together, falling sweetly on the ears, but a dissonance, as Boethius says, "is a harsh and unpleasant collision, since both [of the notes] endeavor to arrive whole, and yet one does not yield to the other," as we will demonstrate more fully in [the course of our] speculations.

Nevertheless, the unison is the source and origin of the consonants in music just as the units are the foundation of the numbers in arithmetic. Therefore, passing over the unison we will say that there are four concordant species, namely: the third, the fifth, the sixth, and the octave, of which two are perfect—that is, the fifth and the octave—but two are imperfect—that is, the third and the sixth. For they are
subtractionem consonantiam non mutant, sed semper bene sonant, hoc est tertia ditonalis vel semiditonalis. Sed differt in hoc, quia illa dicitur maior, ista vero minor. Sic de sexta dicendum; diapente cum tono vel cum semitonio est maior minorve. Octava vero nec augmentum recipit nec decrementum, quin dissonet et discordet, quia semper quinque tonos et duo semitonia vult habere nec plus nec minus; ideoque perfectissima vocatur et aequisona, quia aequae videtur sonare cum prima sicut unisonus. Unde si vir cum puero psallat, in unisono videntur et tamen sunt in octava. Quinta vero si augmentum vel decrementum recipiat semitonii, vel in sextae transit proprietatem vel in tritoni duritiem ac discrepantium convertitur, qua propter perfecta quidem, sed non ut octava. Alius autem rationes mathematicas in theoricis dicemus, quas practici non multum curarent, si hic poneremus, nec etiam recipere potuissent, quoniam oporteret illos prius scire proportiones et proportionalitates. Assentiant igitur rationibus dictis, quoniam omnino circa practicam versantur, et ita lacticinia comedentes ad cibos duriiores adducentur. called imperfect since they are variable, because they do not change [their quality of] consonance by the addition or subtraction of a semitone, for they—that is, the ditonal or semiditonal third—always sound well. But they differ in this, that the former is called major, but the latter [is called] minor. Thus it should be said concerning the sixth: the diapente with a tone or a semitone is a major or minor [sixth]. But the octave does not receive augmentation or diminution without sounding dissonant and discordant, since it always desires to have five tones and two semitones—neither more or less; and therefore, it is called the most perfect and equal in sound, because it seems to sound equal with the first [note] just as the unison [does]. Whence, if a man sings with a boy, they also seem to be in unison, yet [they are singing] at the octave. But if the fifth receives augmentation or diminution of a semitone, either it passes into the quality of the sixth or it is turned into the dissonance and harshness of the tritone; indeed, for that reason it is perfect, but not as [perfect] as the octave. However, in [our] speculations we will discuss other mathematical reasons, which practicing musicians would not pay

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
much attention to if we were to place them here, nor could they even understand [them], since it would be necessary for them first to become acquainted with ratios and proportions. Therefore, let them agree to the reasons mentioned, since they deal exclusively with practice, and thus while consuming lactations, they will be led to more solid food.

---

His igitur sic cognitis, si a quacumque specierum sive consonantiarum octavam intenderimus vel remiserimus, eandem speciem sine dubio procreabimus, quoniam saepe dictum est totum esse concentum diapason. Quidquid igitur de prima, et de eius octava similiter erit. Differt tamen in hoc, quia acutius aut gravius sonat. Erit igitur octava sicut fons, nona sicut secunda, decima veluti tertia, undecima sicut quarta, duodecima velut quinta, tertia decima sicut sexta. Sed decima quarta discrepat ut septima, decima quinta aequisonat sicut octava. Eodem modo a decima quinta usque ad vicesimam secundam faciendum est. Et sic tantum quatuor species sunt differentes consonae, quae per diapason augmentum saepius replicantur. Vocabuntur autem primae simplices, aliae compositae, tertiae decompositae, ut patet in figura.
thus there are only four different consonant species that are frequently replicated by increasing [beyond] the diapason. However, the first [octave] will be called simple, the second [will be called] compound, [and] the third [will be called] decompound, as it appears in the figure.

Itaque si species creans dissona est vel perfecta aut imperfecta, et procreata. Ista autem procreatio consonantiarum secundarum est; quandocunque est altior cantu plano species, a qua intenditur octava, vel sub eodem, quando remittitur. Sed quid, si fiat e converso, hoc est, si a specie inferiori intendatur diapason vel a superiori remittatur? Dicendum, quod a tertia sexta provenit et a sexta tertia et a quinta quarta; ideoque tertia et sexta eiusdem sunt condicionis, quoniam imperfectae. Sed quinta et quarta maxime conveniunt, de quo in theoricis nostris. Sed in hoc volumine, quando de pluribus vocibus tractabimus, dicturum me polliceor. Ad praesens autem sit satis scire, [quod] quantum quinta habet perfectionis, tantum quarta ad dissonantiam accedit et a consonantibus recedit. Sicut, quando sexta ex tertia procreatur et e contra, si creans est maior, creatae provenit

Therefore, if a dissonant species [that is] creating is either perfect or imperfect, so too is the [species that is] produced. However, this procreation of the secondary consonances is whenever in plain song there is a higher species, from which it is raised by an octave, or whenever it is lowered [an octave] below in the same manner. But what if it is done in the opposite way—that is, what if it is raised a diapason from a lower species or it is lowered [a diapason] from a higher [species]? It should be said that the sixth is produced from the third and the third is produced from the sixth; the fourth originates from the fifth, and therefore, the third and the sixth are of the same nature since they are imperfect. But the fourth and the fifth correspond the most, which [we will discuss] in our speculations. And I promise that I am going to discuss it in this volume.
minor et e converso, idem quoque de dissonantitis, quia a secunda septima formatur et e contra. Sed si maior est creans, erit minor creata et e contra.

Nunc autem, quoniam super datum cantum organizare curamus, quasdam regulas breves antiquorum prius inseremus, quarum prima est:

(1) Inchoandum et finiendum est in specie perfecta aut in unisono.

Secunda: Non unam post aliam similem facere nec unisonum licet.

(2) One is not allowed to make a similar [species] or a unison one after another.

3a: Imperfectae duae aut plures unam post aliam possunt dari.

(3) Two or more imperfect [consonances] are able to be given one after another.

4a: Si cantus continuetur in eodem sono per duas voces aut plures, organum in eodem sono non

(4) If a song continues for two or more notes on the same sound, the organum [should] not rest
quiescat, sed per diversa loca mutetur.

Quinta regula: Sexta maior coniungit ad octavam, minor vero disiungit ad quintam. Sic et 3a maior ad quintam disgregat, minor autem ad unisonum adducit.

6a: Si tenor ascendit, contrapunctus descendere procuret.

Prima enim regula sic declaratur: Cum incipimus organizare/ ponamus vocem in quinta vel in octava aut in aliqua alia ab istis composita secundum vocis commoditatem et etiam in unisono; et cum finimus, hoc idem faciendum. Hoc autem est propter hoc, quia aliae consonantiae non sunt tantae perfectionis, quantae sunt istae. Ideo in principio meliorem facere et in fine debemus, in medio vero imperfectiores interserere lictum est.

Secunda regula intelligitur sic: Non debemus dare, hoc est bis perfecte consonare cum tenore ascendente vel descendente simili specie perfecta, quoniam tunc idem processus videretur.

on the same sound, rather it [should be] moved through different steps.

(5) The major sixth ascends to the octave, but the minor [sixth] descends to the fifth. Thus also the major third ascends to the fifth; however, the minor [third] leads to the unison.

(6) If the tenor ascends, let the counterpoint descend.

For the first rule is explained in this way: when we begin to make organum, let us place a note on the fifth or on the octave, or on some other [note] composed from these according to the convenience of the note, and also on the unison; and when we end, the same thing should be done. Moreover, this is [done] for this reason because the other consonants are not of as much perfection as these are. Therefore, we should do [this] at the beginning and at the end in order to make [the song] sweeter; but certainly one is permitted to insert the more imperfect [consonants] in the middle.

The second rule is understood in this way: we should not give—that is, harmonize—two times in a perfect manner with the tenor ascending or descending by a similar perfect species, because
Nam si tenor d c et organum l k in octava, eadem vox videretur esse; sic et de unisono. Etiam si dicatur h g, prohibetur eadem ratione, non quod omnimoda sit similitudo, sed quia magna. Tristanus vero de Silva in quinta, ut ait, non prohibitur taliter, quoniam potest fieri quinta post quintam, dum tamen una sit semidiapente, alia vero diapente, sicut reperimus in cantilenae Sois emprantis et in aliis antiquioribus. Sed hoc non est concedendum in integris, bene tamen in fractis, id est in diminutione notularum, de qua paulo post dicemus. Dissimiles tamen perfectae possunt fieri permutae, hoc est post quintam octava aut post octavam quinta hoc modo, ut si tenor d e c d, organum vero l l k h; et sic in aliis.

Tertia regula sic est intelligenda: Si tenor ascendit c d e, organum poterit eodem modo ascendere e f g. Idem in descensu et eodem modo cum

then it would seem to be the same progression. For if the tenor is d c and the organum is l k at the octave, it will seem to be the same note; likewise also concerning the unison. Also, if h g is sung, it is prohibited for the same reason, not because there is similitude in every way, but because [the resemblance] is great. For as Tristan de Silva says, "It is not prohibited in such a manner on the fifth, since a fifth after a fifth can be made as long as one is a semidiapente and the other is a diapente, as we find in the song Sois emprantis and in other more ancient [songs]." But this should not be allowed in whole [note values]; nevertheless, it is acceptable in divided [note values]—that is, in the diminution of the notes—which we will discuss a little later. Nevertheless, many dissimilar perfect [consonances] are able to be made—that is, the octave after the fifth or the fifth after the octave—in the following way: if the tenor is d e c d, the organum will be l l k h, and likewise in other [octaves].

The third rule should be understood in this way: if the tenor ascends c d e, the organum will be able to ascend in the same way, e f g. The same
nsexta similiter in aliis locis. Non tamen ex hoc arbitretur organizans, si tenor steterit per duas aut plures notas in eodem sono, duas aut plures in eodem loco imperfectas cum organo [fieri] posse. Et sic declaratur regula quarta, quamquam istud non nimis prohibitum est a multis, praesertim in compositione trium aut quatuor vocum, quoniam ibi licitum est.

Quinta sic declaratur: Si tenor descendit d c, nos ascendimus § k. [Quod] si descendit ab e in d vel alio simili loco, non debet facere organum k l, quia sexta minor. Quod si facere velimus, oportet nos k elevare, si ab inferiori ascendimus parte, aut substinere, si a superiori descendimus voce. Quod si depingatur, debet sic figurari £££, ex quo sequitur unus notabile documentum et est: Si cantus descendat f e d, organum k k l facere non licet, quoniam sequitur unus duorum inconvenientium, videlicet aut a sexta minori in octavam conduce aut in eodem loco voces inaequales pronuntiare, loco cuius decet facere l k l aut h k l, quoniam tunc in primo modo solum

thing [occurs] in the descent, and likewise in the same way with the sixth at other places. Nevertheless, let not the one making organum think that, because of this, if the tenor remains on the same sound for two or more notes that two or more imperfect [consonances] can be made at the same place with the organum. And thus the fourth rule is explained, although this is not particularly prohibited by many people, especially in the composition of three or four voices, since it is permitted there.

The fifth [rule] is explained in this way: if the tenor descends d c, we ascend § k. But if [the tenor] descends from e to d, or at another similar place, the organum must not make k l because it is a minor sixth. But if we wish to do [this], it is necessary to raise k if we ascend from the lower part [to a higher] note, or to sustain [e] if we descend from the higher note [to the lower note— that is, from c to b]. But if it is written down, it must be depicted in this way: £££; from which follows a notable example: if the song descends f e d, the organum is not allowed to make k k l, since there follows one of two inconsistencies, namely: either it is carried from the minor sixth to the
descendit per semitonium
subintellectum, in secundo
vero per ditonum ascendit,
et si depingatur, signetur
ut supra. Unde
advertendum est, quod in
prima parte diximus de
semitonio subintellecto,
et considerandum, quando
nota est elevata a proprio
loclo vel depressa, et
cavendum a speciebus
perfectis, si contrariae
sint, ut, si tenor d f g
psallat et tales
conditiones habuerit, per
quas a loco proprio f sit
elevata, organum non
unisonum neque perfectam
speciem [faciat] super
eandem. Eodem modo
psallens tenor d c d
immediate reversus supra c
non sonabit perfecte,
secus, si pauset in c aut
distinctionem ibidem
faciat. Quod autem sexta
minor disiungat ad
quintam, sic probatur:
Tenor stans in eodem per
duas voculas aut plures
uti d d d, organum faciat
h b h. Similiter si
cantus descendat per
semitonium realiter aut
subintellecte, organum
stans in quinta maneat in
eadem, ut, si tenor sit f
e f, organum erit k k k.
Quidam vero istud
prohibent scilicet organum
per tres notas in eodem
sono vagari, quamquam
species sint diversae;
dicunt propter hoc, quia
contrapunctus videretur
esse cantus firmus. Sed
istud minime obstat, quia
utraque vox recte dici
posset organum et tenor,
cum notulam integram
octave, or it proclaims
unequal notes at the same
place. Instead, it is
suitable to make l k l or
h k l, since in the first
way it merely descends by
a semitonus
subintellectus, but in the
second way it ascends by a
ditone; and if it is
written down, let it be
marked as above. Whence,
what we have said in the
first part concerning the
semitonus subintellectus
ought to be noted; and it
should be considered that
when the note is raised or
lowered from [its] proper
place, the perfect species
should also be avoided if
they are opposites, for
example: if the tenor
sings d f g and it has
held such conditions by
which f is raised from
[its] proper place, the
organum will make neither
a unison nor a perfect
species above the same.
In the same manner, the
tenor singing d c d,
immediately reversed above
c, will not sound in a
perfect way; [it will be]
otherwise if it pauses on
c or makes a distinction
at the same place.
However, that which causes
the minor sixth to descend
to the fifth is
demonstrated in this way:
[when] the tenor is
remaining on the same
place for two or more
notes, such as d d d, let
the organum perform
h b b h. Similarly, if the
song descends by a
semitone in a real or
subintellectus manner, the
utrobique ponamus. Sed quia ab usu communi discedere nolumus, quod non faciant cum eis concordantes prohibemus, scilicet quod ultra duas notulas non quiescat organum in eodem sono. Ergo in exemplo praehabito dicat h k k. Quod autem tertia maior ad quintam disgreget, sic exemplificatur: Sit tenor h g f, organum k k k. Quapropter cavendum sicut in sexta; si tenor cantaverit g e d, organum non faciet g g h, sed potius e g h aut g g h, et e g ditonus est et g semiditonus. Et sic efficitur tertia maior cum tenore, quoniam g elevatur [note] propio et, si depingitur, signetur ut supra. Idem quoque, si dicatur f d c, organum f f g non faciet. Poterit tamen hoc facere h f g aut d f g delet et tamen h f semiditonus est, d f vero ditonus. Quod si depingatur, debet sic signari 53. Quod autem tertia minor coniungat organum cum tenore, patet; si tenor dicat f e f, optime sonat h g f. Sic etiam, si tenor sit f g h, organum k h k, non tamen k g h. Quapropter cavendum, si tenor sit f g g, organum non faciat k h g, aut si tenor sit g g h, organum non faciat l h h, bene tamen l h h. Si autem tenor psallerit hoc modo g f g, poterit organum facere g h g aut h g, quoniam illa tertia, etsi maior videatur, organum that is fixed at the fifth may remain on the same [note], for example: if the tenor is f e f, the organum will be k k k. But some prohibit this—that is, they prohibit the organum to be sounded on the same sound for three notes even though the species may be different; they say this for this reason: [because] the counterpoint would appear to be a cantus firmus. But this by no means hinders [it], because both voices—the organum and the tenor—are able to be sung correctly when we place a whole note [value] in both [places]. And since we do not want to depart from common use, agreeing with them we prohibit [the singers] from doing this—namely, that the organum not remain on the same sound for more than two notes. Therefore, in the given example, let [the organum] sing h k k. Moreover, the fact that the major third ascends to the fifth may be exemplified in this way: let the tenor [sing] h g f [and] let the organum [sing] k k k. Wherefore, one should take care just as on the sixth: if the tenor sings g e d, the organum will not make g g h but rather e g h or t g h; and e g is a ditone while t g is a semiditone. And thus a major third is produced with the tenor, since g is raised from its proper place, and if it is written, let it be marked.
subintellecte efficitur minor. Istud tamen de tertia maior aut minori plerique non observant, propter quod eorum compositiones, etsi prima facie delectent, quia inaudita est cantilena, cum ad frequentiorem usum conferuntur, in dies magis ac magis displicent, et ignorant causas cantores et has, quas diximus, et alias, quas de diminutione paulo post dicemus.

as above. Likewise also, if [the tenor] sings f d c, the organum will not make f f g. Nevertheless, the latter will be able to perform h f g or d f g; and still h f is a semiditone, but d f is a ditone. But if it is written down, it should be marked in this manner: ❄️. Moreover, it is clear that the minor third unites the organum with the tenor: if the tenor sings f e f, optimally [the organum] will sound h g f. Thus also, if the tenor is f g h, the organum is k b h rather than k h h. Wherefore, one should take care that if the tenor is f f g, the organum may not perform k h g; or if the tenor is g g h, the organum may not perform l h; still it is acceptable [to perform] l b h. However, if the tenor sings in this way, g f g, the organum will be able to perform g h g or h g, since that third, although it appears to be major, is made minor in a subintellectus manner. Nevertheless, most [composers] do not observe this in regard to the major or minor third, because their compositions --although they are pleasing at first because the song is unusual-- become more and more displeasing in time after they are subjected to more frequent use; and the singers are unaware of the
reasons—both these which we have discussed and others concerning diminution which we will discuss a little later.

Therefore, the counterpoint should advance in this way to the nearest species, such as from the sixth to the octave or the fifth, from the third to the unison or the fifth, and likewise concerning the species of the compound and the decompound [octaves]. But sometimes the organum may sing through a diatessaron and a diapente, or even through a diapason, and then the organum is able to arrive at the octave from the third, for example: if the tenor is \( f e \), the organum is \( h m \); or if the tenor is \( g f \), the organum is \( g k \); or if the tenor is \( d d c d d e d \), good organum is this: \( f n m h l k l \) and similarly in other tropes. Nevertheless, there is an excellent way of making organum: when the organum imitates the tenor in ascent or descent it begins on the same note— not at the same time but after one or more notes—to make the same song or a similar [song] at the diatessaron or the diapente, or even at the diapason or its compound and decompound [octaves] above or below.

Practicing musicians call this method fugue, because one note follows another with a similar arsis or
quoque de eorum compositis, de unisono aut diapason. Si tenor d e f g d c f e d, organum post duas notulas idem poterit in octava resonare, quod [est] l m n o l k n m l. Idem in unisono ac in suis sub et supra octavis. Sed in his exemplis ponimus illas ultimas voces in organo tenore non habente aliquid pro eis, ut similitudo ostenderetur, quia supponimus, quod voces, quae sequuntur in tenore, non discordent cum illis, quia, cum fuga incipit discordare, in similitudine fiat immediate dissimilitudo, ita ut non faciat contra regulas supra dictas.

Sexta autem regula sic declaratur: Si cantus intenderit vocem, discantus remittat ad speciem opportunam secundum regulas assignatas et si tenor descenderit, contrapunctus thesis, for example: if the tenor sings l n m l n m o, the organum is able to follow [the tenor] after the first note at the diatessaron below, singing h k l h k l. Likewise also, the organum will sing p r q p r q s with the same rest [of one note] observed at the diapente above. The same also with regard to their compound [octaves], the unison or the diapason. If the tenor is d e f g d c f e d, after two notes the organum will be able to sound the same [pitches] at the octave— that is, l m n o l k n m l. Likewise, at the unison and on its octaves above and below. But in these examples we place those last notes in the organum with the tenor not having anything [to correspond] with them, in order that a similitude may be shown, since we suppose that the notes which will follow in the tenor will not disagree with them. For when the fugue begins to be discordant, let the dissimilitude immediately be made into a similitude, in such a manner that it is not done against the rules mentioned above.

And the sixth rule is explained in this way: if the cantus raises the voice, let the discant descend to a suitable species according to the established rules; and if the tenor descends, let
ascendat. Et hoc est, quod frequentius in contrapuncto est observandum; nam ex hoc fertur assumpsisse vocabulum.

the counterpoint ascend. And this is what should be observed more frequently in counterpoint; for from this the name [counterpoint] is said to have been taken.
Omnia autem praedicta intelliguntur fere, quando tenor gradatim intenditur vel remittitur. Sed quid, si per saltus et anfractus? Dicendum, quod, quando taliter incedit, tunc magis organum debet voces suas coadunare, ut si tenor psallat d h d, organum faciet l k l aut l m l sive l m n. Sic in aliis modis diapente. Quod si diatessaron hoc modo d f c, organum l k k, vel si tenor c f d, organum k k l.

Ugolino, with some barbarous measures, established common rules concerning all the species, as much for the simple species as for the compound, of which some hold true, but certain ones do not hold true at all. But in order that truth may shine forth, and falsehood may blush with shame and be thrown into disarray, I will briefly explain here the same rules in this
Tertia sit infra, unisonus si tenditur una. Tertia vel quarta si tendit, infra diapente tenebit. Si quintam ascendit, diapason tantum terminabit.

Secunda regula de unisono descendendo:

Tertia sit supra, unisonus si remittitur una. Ad quintam tendit, si tertiam quartamve remittit. Octavam petit, si quintam vel ultra deponit. Si plura pertransit, rationis ordo docebit.

Tertia regula [de tertia ascendendo]:

Unisonus fiat, unam si tertia tendat. Si plures tendat, unisonus tandem fiat. Tertia remittit, si ter vel quater ascendit.

manner, speaking first about the unison ascending:

If the unison is raised one [step in the tenor], [the organum] is a third below. If [the unison] ascends a third or a fourth, [the organum] will hold the diapente below. If [the unison] ascends a fifth, [the organum] will merely end at the diapason.183

The second rule of the unison descending:

If the unison is lowered one [step in the tenor], [the organum is at] the third above. If [the unison] descends a third or a fourth, [the organum] ascends to [create] a fifth. If [the unison] descends to the fifth or beyond, [the organum] seeks the octave. If [the unison] passes through several [notes], the rule of reason will explain [it].

The third rule of the third ascending:

If the third ascends one [step in the tenor], let a unison be made. If [the third] ascends for several [steps], then let a unison be made. If [the third] ascends three or four [steps], [the organum] descends to [create] a third.184
Quarta regula de tertia descendendo:

Quinta ter fiet, si tertiam solam remittit.
Si plures fuerint, eas quintam terminabit.
Si tertiam vel quartam, octavam super intendas.
Quinta supra fiet, si cum octava iungatur.

Quinta regula de quinta ascendendo:

Quinta quaerit tertiam, si fit ascensus in unam.
Unisonum dicas, si tertiam vel quintam intendas.

Sexta regula de quinta descendendo:

Octavam quinta petit, si solam unam descendit.
Erit octava; sexta, si alteri sit sociata.
Post quintam octavam fiet, si tertiam infra [remittat].
Si quartam vel quintam, decimam intendere sinat.

Septima regula de sexta [ascendendo]:

The fourth rule of the third descending:

If the third descends one [step in the tenor], then the third will be made [into] a fifth.185
If there have been several [steps], a fifth will end them.
If [the third descends] a third or a fourth, you [should] ascend to the octave above.
If [the third] is joined with the octave, a fifth will be made above.186

The fifth rule of the fifth ascending:

The fifth demands the third if [the tenor] ascends one [step].
If you ascend a third or a fifth, you [should] sing a unison.187

The sixth rule of the fifth descending:

The fifth seeks the octave if [the tenor] only descends one [step].
There will be an octave, if the fifth is joined with the second [note being] a sixth.
An octave will be made after the fifth if [the tenor] descends a third.
If [the tenor descends] a fourth or a fifth, let [the organum] be allowed to extend to the tenth.

The seventh rule of the sixth ascending:
Sexta tertiam cupit, si supra notam intendit.

Octava regula de sexta [descendendo]:

Sexta vult octavam, infra si tendit ad unam;
   Et plures fiant, si antecedunt octavam.
   Vult [decimam] sexta tertia remittens et infra.

Nona regula de octava ascendendo:

Post octavam quinta, si cantus intenditur una.
   Si quartam vel quintam psalliit, tertiam iure poscit.

Decima regula de octava descendendo:

Octava decimam, si solum deponit unam.
   Tertia si fuerit, tunc duodecima fiet.

Undecima regula de decima ascendendo:

Decima vult octavam, unam dumtaxat intensam.
   Plura si transcendit, tunc quinta locum habebit.

The sixth desires the third if [the tenor] ascends to the note above.

The eighth rule of the sixth descending:

The sixth desires the octave if [the tenor] descends one [note]; and several [sixths] may be made if they precede the octave.

The sixth desires the tenth when the tenor descends a third and beyond.¹⁸⁸

The ninth rule of the octave ascending:

[One should sing] the fifth after the octave if the cantus is raised one [step].

According to the rules, [the octave] demands the third if [the tenor] sings a fourth or a fifth.

The tenth rule of the octave descending:

The octave [demands] the tenth if [the tenor] only descends one [step].

If the octave [descends] a third [in the tenor], then a twelfth will be made.

The eleventh rule of the tenth ascending:

The tenth desires the octave, provided that [the tenor] has risen one [step].

If [the tenor] passes through several [steps],

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Duodecima regula de decima descendendo:
Decima descendens duodecimam cupit habere.

Decima tertia regula de duodecima ascendendo:
Unam intendens duodecima decimam quaerit.
Octavam tertia quartaque, quinta quintamque sequentem.

Decima quarta regula de duodecima descendendo:
Quinta cum decima post duodecimam fiat.
Si societur, tertia cum decima detur.
Tertia cum decima quintam cum decima poscit.

Prima regula sic redarguitur: Si tenor psallat $f\, g$, organum ita potest dicere $f\, c$ sicut $f\, e$. Quod si tertiam ascendit, ut ipse dicit, melius organum manet in tertia, quam vadat ad quintam. Quod si quartam hoc modo $g\, k$ tenor, organum recte faciet $g\, c$; quod si diapente sicut $f\, k$, organum ita recte faciet $f\, f$ sicut $f\, c$.

then the fifth will take the place [of the octave].

The twelfth rule of the tenth descending:
The tenth [with the tenor] descending desires to have the twelfth.

The thirteenth rule of the twelfth ascending:
[When the tenor] ascends one [step], the twelfth seeks the tenth; [when the tenor] ascends a third and a fourth, [the twelfth seeks] the octave; and [when the tenor] ascends a fifth, the twelfth seeks a fifth after it.

The fourteenth rule of the twelfth descending:
Let the fifteenth be made after the twelfth.
If [the twelfth is associated with the fifteenth], let a thirteenth be made [between them].
The thirteenth demands the fifteenth.

The first rule is refuted in this manner: If the tenor sings $f\, g$, then the organum can sing $f\, c$ as well as $f\, e$. But if [the tenor] ascends a third, it is better for the organum to remain on the third rather than to go to the fifth as the master [Ugolino] says. But if [the tenor] ascends a fourth in this manner, $g\, k$, the organum will properly perform $g\, c$; but
Secunda vero regula: Si tenor descendit $f \ d$, organum ita bene faciet $f f$ sicut $f h$. Tertia vero satis bene.

Quarta vero regula: Si tenor psallat $f \ e \ d \ c$, organum ita recte faciet $h g \ k$ sicut $h g f g$. Similiter si tenor fecerit $f d$, organum ita bene faciet $h h$ sicut $h l$.

Quinta regula reprobatur similiter, quia, si tenor psallerit $f h$, organum ita bene faciet et melius $k f$ vel $k k$ quam $k h$. Et si tenor $d h$, organum ita bene dicet $h f$ sicut $h h$ et quandoque $h k$, sed raro nisi variationis causa.

Sexta regula satis bene transit. Verum si tenor psallerit $f c$, organum ita bene $k k$ sicut $k m$. Similiter si $g c$ tenor, organum ita bene $l k$ sicut $l m$.

And [in regard to] the second rule: If the tenor descends $f d$, then the organum will properly perform $f f$ as well as $f c$.

And [in regard to] the fourth rule: If the tenor sings $f e d c$, then the organum will properly perform $h g \ k$ as well as $h g f g$. Similarly, if the tenor has performed $f d$, then the organum will properly perform $h h$ as well as $h l$.

The fifth rule is rejected for a similar reason because if the tenor sings $f h$, then the organum will properly perform $k f$ or $k k$, even better than $k h$. And if the tenor [sings] $d h$, then the organum will properly sing $h f$ as well as $h h$, and sometimes $h k$, but rarely except for the sake of variation.

The sixth rule passes well enough. Certainly if the tenor sings $f c$, then the organum [will properly sing] $k k$ as well as $k m$. Similarly, if the tenor [sings] $g c$, then the organum [will properly sing] $l k$ as well as $l m$. 
Septima satis bene; 
verum si tenor e f,
organum ita bene k k sicut 
k h, quia ex sexta mini 
bene tendimus in quintam.

Octava regula bona 
videtur. Sed etiam tenore 
dicente f d organum 
poterit dicere l l sicut l n.

Nona redarguitur, quia, 
si tenor dixerit c f, 
organum poterit k k dicere 
sicut k h.

Decima reprehenditur, 
quoniam, si tenor psallat 
e c, organum melius faciet 
m m quam m o.

Undecima vero multum 
discedit a veritate, quia, 
cum tenor saltus facit et 
anfractus, organum debet 
voces suas coadunare. Nam 
si ambo per saltus et 
anfractus discurrent, 
certamen potius quam 
harmonia dicetur, ut si 
dicat c d, organum melius 
faciet m h quam m l. Et 
tunc tantum, quantum tenor 
incipiat saltus et 
anfractus facere, (tanto) 
organum incipiat 
coadunare, ut, cum tenor c 
e, organum m l, tenor c f, 
organum m k, tenor c g, 
organum m l. In hoc enim 
exemplo, si advertas, 
maxima est convenientia, 
quoniam tenor a secunda

The seventh [rule] is well enough. Certainly if 
the tenor [sings] e f, 
then the organum [will properly sing] k k as well 
as k h, because we 
properly proceed to the 
fifth from the minor sixth.

The eighth rule seems to be good. But even with 
the tenor singing f d, the 
organum will be able to 
sing l l as well as l n.

The ninth [rule] is refuted, because if the 
tenor has sung c f, the 
organum will be able to 
sing k k as well as k h.

The tenth [rule] is refuted, since, if the 
tenor sings e c, it will 
be better for the organum 
to perform m m rather than 
m o.

The eleventh [rule] deviates greatly from the 
truth, because when the 
tenor makes leaps and 
digressions, the organum 
should unite its notes 
together. For if both 
[voices] run [in] 
different directions by 
leaps and digressions, it 
will be called contention 
rather than harmony, for 
example: If [the tenor] 
sings c d, it will be 
better for the organum to 
perform m h rather than 
m l. And then, as the 
tenor begins to make leaps 
and digressions, the 
organum begins to unite 
[its notes], so that when 
the tenor [sings] c e, the
usque ad quintam paulatim
incipit psallere, organum
vero e contra a quinta
usque ad secundam voces
coadunavit. Hoc enim modo [56]
harmonia generat in animos
audientium quandam insitam
dulcedinem, quae non
potest explicari sermone.
Verum nostri cantores haec
minime considerant, sed
illud tantum, quod
imaginationi seu fantasiae
suae placet, secundam
accidentem dispositionem
credunt omnibus advenire.
Et inde est, quod vulgus
ad musicam vel, ut verius
loquar, ad harmoniam novam
non ita sponte
convertitur, sicut
solebant antiquitus.
Verum de his rationibus in
secundo libro
evidentissime dicemus.
Haec autem diximus, ut
quosdam cantores ab
opinionibus erroneis
abstraheremus et ad veram
musices agnitionem
reduceremus.

The other rules
are sufficiently consonant with the
truth, but they should be

organum [sings] m \text{ IV} ;
[when] the tenor [sings]
c \text{ f}, the organum performs
m \text{ k}; [when] the tenor
[sings] c \text{ g}, the organum
performs m \text{ I}. For if you
take note [you will find
that] there is the
greatest harmony in this
example, since the tenor
begins to sing gradually
from the second up to the
fifth, but the organum has
united [its] notes to the
contrary—from the fifth
up to the second. For in
this way, harmony
generates a certain
natural sweetness in the
souls of the listeners
that cannot be explained
with words. Certainly our
singers do not consider
these things at all, but
only that which is
pleasing to their
imagination or fantasy;
they believe that a
favorable disposition
comes to all by chance.
And for that reason, the
public is not so freely
converted to [our] music,
or to speak more frankly—
to new harmony—as they
were accustomed to the
old. Truly, we will speak
with the greatest evidence
concerning these theories
in the second book.
However, we have said
these things in order that
we might remove certain
singers from erroneous
opinions, and draw them
back to the true knowledge
of music.
quia superfluae. Nam ultra diapason semper est reiteratio primae. Et si dicatur, quod propter quintam vel quartam, dicemus: propterea dedimus modum componendi quintam a quarta et e contra et reliqua diligenti indagatori relinquimus. His etenim paucis regulis tota ars contrapuncti vel organi poterit constringi. Cetera vero, quae circa organizationem accidere possent, in arbitrio canentium relinquimus, dum tamen contra regulas alicuid facere caveant, quoniam, etsi minime probantur, a veritate tamen non discedunt. Servet quoque modum in arsi et thesi, hoc est, ab inferiori voce ad altiorem sui ipsius sit modus ordinatus ut tropus. Et pneuma servet et pausationes in dandis perfectis speciebus, ut, si tonus sive modus sit primi, consonantiae perfectae in d, in h, l frequententur, quandoque autem in f vel in o, raro in g vel in k, numquam tamen in e vel in 4 quadro. Hoc tamen est intelligendum cum distinctione, quoniam alias ubicumque possunt fieri. Servet etiam organizans pneuma troporum, ut pneuma pneumatibus corrispondeant. Nam si pneuma tenoris fuerint primi, et organizantis erunt, ut, si tenor f d c d g d c g e f d, organum rejected for this reason: because they are superfluous. For there is always a reiteration of the first beyond the diapason. And if it is said that it is on account of the fifth or the fourth, we will respond that we have given a method of composing the fifth from the fourth and vice-versa with that taken into account, and we leave the rest to the diligent researcher. For the entire art of counterpoint or of organum will be able to be drawn together with these few rules. But everything else, which falls into the category of making organum, we will leave to the judgment of the singers, provided that they avoid doing anything contrary to the rules, since although they are not at all demonstrated, at least they do not deviate from the truth. Also, let [the singer] observe the mode in arsis and thesis—that is, let it be an ordered mode from its lower note to its higher [note]—like a trope. And let him observe the neumes and the rests in the given perfect species, so that if the tone or, if you prefer, the mode, is that of the first, the perfect consonants are frequently made on d, h, and l; however, sometimes [they are made] on f or o, rarely on g or k, but never on e or square 4. Nevertheless, this should
organizatio est phrygii, secunda vero dorii. Ne quis arbitrari possit ista parva exempla non sufficerre ad totam doctrinam capessendam, sub et supra per totam manum damus eis modum subtiliorem, ut per lineas et spatia ista disponant exempla. Deinde idem, quod fuit dorii, ponatur in phrygio et in lydio et in mixolydio; et de suis plagalibus similiter fiat. Et quando species aliqua bonam consonantiam non fecerit, elevetur per signum aut deprimatur, ut consonantia prima totam sui recipiat quantitatem aut dimittat, si quid superfluum habet. Ut autem omnia, quae dicta sunt, facilius teneantur, ante oculos subiiciatur exemplum:
organum: \[l \ h \ k \ l \ l \ m \ h \ l \ m \ l \ k \ l \ h \ g \ h \ + \ k \ l \]
tenor: \[d \ d \ e \ d \ f \ e \ f \ d \ c \]

be understood with discretion, since at other times they can be made elsewhere. Let the one making organum also observe the neumes of the tropes, so that neumes correspond to neumes. For if the neumes of the tenor have been of the first [mode], [neumes of the first mode] will also be made in the organum, for example: If the tenor [sings] \[f \ d \ c \ d \ g \ d \ c \ g \ e \ f \ d\], the organum will not perform \[h \ + \ m \ l \ + \ k \ + \ k \ + \]

but rather \[h \ l \ m \ l \ l \ n \ m \ l \ m \ k \ l \]
since the first [way of making] organum is that of the Phrygian [mode], but the second [way of making organum] is that of the Dorian [mode]. And in order that no one can think that these few examples are not sufficient for the entire doctrine to be grasped, we give to them a more refined method of making use of the whole hand--both the upper part and the lower--so that they may arrange these examples by means of lines and spaces. Then let the same that was the Dorian's, be established on the Phrygian, and on the Lydian, and on the Mixolydian; and let it be done in the same manner on their plagals. And when any species has not made a good consonance, it is raised or lowered by means of a sign, so that if what the first consonance holds is superfluous, it may
accept or dismiss all of its quantity. And now, so that everything which has been said may be grasped more easily, let this example be placed before [your] eyes:

organum: l h k l l m h l m l k l h l l k l l h k l h g h l k l

tenor: d d e d f e f d c d e d f g f g h g h h d f e f g e d

Liquet his paucis exemplis praemissis tota ars contrapuncti concludi per variationem exemplorum per diversa loca; per fictam per rectamque musicam eadem variata sicque per eadem variata varia crescit. Quod si unum pneuma tot modis variatur, ut dictum fuit, in tropis, quanto magis cum consonantibis diversis variabitur. Et sic praedicta in hac parte sufficerent. Sed cum tot et tanta supervacanea incommoda, inutilia, prolixia atque superflua in prima parte artem Guidonis musicae tribuisse monstratum sit, sequaces eius caeco ducatu claudicantes, subtillia se credentes investigasse peiora, prolixiora, inutiliora tribuerunt. [57] With these few proposed examples, it is clear that the entire art of counterpoint is made up of a variety of examples in diverse places; the same is varied by means of musica ficta and musica recta, and thus by making a small change, the variations are exceedingly increased by the same example [occurring] in different tropes. But if one neume is varied in so many ways—as it has been said [in the section] on the tropes—how much more it will be varied with diverse consonants. And thus [those things which were] previously discussed in this part will be sufficient. But since it has been shown in the first part that the theory of Guido has ascribed so many unnecessary, useless, tedious, and superfluous inconveniences to music, his followers—having been crippled by blind leadership [and] believing themselves to have made a precise investigation—ascibe [even] worse, more
tedious, [and] more useless things to music.

However, it is as they say: Whoever attempts to make counterpoint does not avoid the hexachord in plain song by singing above or below that which they call gamma; this is because their entire hand is contained [between] gamma and e la. One harmonizes with a hexachord taken on the theme, and they make seven gammas along with the seven hexachords in this manner; they call the first low 4, the second low natural, the third low soft b, the fourth middle 4, the fifth high natural, the sixth high soft b, and the seventh high 4. However, we will demonstrate with the firmest reasons that this is superfluous and of little importance. They arrange the gammas which will be able to be investigated by other [means], and they leave out other things that are necessary—namely, [matters] of the coniuncta. But we, who take care to flee digressions and avoid tediousness, and bring the truth into the light and confound falsehood, will give a very easy method for learning all the gammas, completing their diminution and avoiding their falsehood.
Accipiamus igitur primum hexachordum scilicet retropolis, [quod] terminatur in d sol re. Loquimur enim per terminos ipsorum. Respiciemus igitur per totam manum, quae voces eius concordant, et sic istud compenemus. I ut igitur ex isto hexachordo habebit re, quia unisonus, fa quia tertia, la quia quinta, a re ut tertia subtus, mi unisonus, sol tertia supra, b mi re tertia sub, sed unisono carebit, la tertia supra; c fa ut ut, mi, sol; d sol re ut, re, fa, la; e la mi re, mi, sol; f fa ut ut, mi, fa, la; g sol re ut re, fa, sol; a la mi re ut, mi, [sol] la; b fa re, fa, la; c fa ut, mi, sol; d sol re ut re, fa, sol; a la mi re ut, mi, [sol] la; b fa re, fa, la; c fa ut ut, mi, sol; d sol re ut re, fa, sol; a la mi re ut, mi, sol, la; b fa will have] re, fa, la; [and] mi will have] re, la. Et hucusque differentia fuit in quolibet loco. Postea vero c sol fa ut sicut c fa ut, ut, mi, sol obtinebit; sic d la sol re, sicut d sol re, ut, re, fa, la; nec differunt, nisi quod, si illorum sunt simplices, istorum compositae sunt, quod si priorum compositae, istorum decompositae erunt, de qua compositione iam diximus supra. Idem quoque de reliquis locis seriatim dicendum.

Therefore, let us take the first hexachord--that is, retropolis--which ends on d sol re. For we [will] discuss them according to their boundaries. Therefore, by means of the entire hand we will consider which of its notes are concordant, and in this manner we will make this [hexachord]. Accordingly, in conformity with this hexachord I ut will hold re, which is the unison [in respect to I ut]; fa, which is a third [from I ut]; la, which is a fifth [from I ut]; ut, which is the third below a re; mi, [which is] a unison [in respect to a re]; sol [which is] the third above [a re]; [and] re [which is] a third below b mi. But it will lack the unison [in respect to b mi]; la [will be] the third above [b mi]; c fa ut [will have] ut, mi, sol; d sol re [will have] ut, re, fa, la; e la mi [will have] re, mi, sol; f fa ut [will have] ut, mi, fa, la; g sol re ut [will have] re, fa, sol; a la mi re [will have] ut, mi, sol, la; b fa [will have] re, fa, la; [and] mi [will have] re, la. Up to this point, the difference was on any position whatsoever. But after that, c sol fa ut just as c fa ut will possess ut, mi, sol; likewise, d la sol re just as d sol re will possess ut, re, fa, la; and they do not.
Quod si facillime volumus et alia gammata sine magno labore componere, disposito primo sic faciemus: c fa ut quinto loco sedet ab ista coniuncta; sic ergo quinis in locis se renderunt. Arguemus igitur sic:

tanta distantia est inter gamma et gamma, quanta inter Γ ut et d sol re; ut ergo se habuit illud gamma cum Γ ut, ita istud cum d sol re. Quoniam re, fa, la est utroque, consonantiae eaedem sunt. Sic e la mi cum a re, quia in utroque ut, mi, sol. Ratio est demonstrativa, quoniam tantum distat e la mi a suo gammate quantum a re ab eo, cui comparatur. Sed cum pervenimus ad f fa ut et b mi, non tanta distantia est, quia alius per semitonium, aliud vero per tonum distare monstratur nec similiter signa inter se distant per diapente, quemadmodum ipsa hexachorda sive gammata. Unde in hoc non eodem modo procedit argumentum. Quapropter cavendum et in his et in aliis, cum ita
der differ except that if those of the former are simple, [then] those of the latter are compound, but if those of the first are compound, then those of the latter will be decompound, whose arrangement we have already discussed above. The same also should be said concerning the remaining positions in succession.

But if we want to make other gammas in the easiest possible way and without great labor, we will do the following with the first arrangement: c fa ut sits on the fifth place from this coniuncta; consequently, they will express themselves in fifths in this manner. Therefore, we will show [them] in this way: There is as much distance between gamma and gamma as between Γ ut and d sol re; accordingly, as the former gamma was held [in relation] to Γ ut, so the latter gamma [c] is to d sol re. Since re, fa, la are on both, the consonances are the same. Thus the consonances are the same between e la mi and a re, because ut, mi, sol are on both. The reason is demonstrative, since e la mi is as distant from its gamma as a re is from that to which it is compared. But when we arrive at f fa ut and b mi, there is not as great a distance, because one is shown to be distant
contingerit, ne consonantia perfecta in altero illorum signorum ponatur. Sic ergo $b\ mi$ tantum habebit re, $la$, tertia sub et supra; sed in $f\ fa \# mi$ loco sive signo, qui duplicem locum habet, idem semper faciendum, quoniam primum gamma perfectum habet cum $fa$, secundum vero cum $mi$. Ita et in suis octavis. Tertium gamma ponimus hoc modo: diatessaron remissa ab isto secundo venit in $\Gamma$ ut. Qualiter ergo se habet gamma ad gamma, ita et signa, quae in eadem locata fuerint differentia. Unde sicut secundum in $d\ sol\ re$, ita tertium in $a\ re$ et in aliis quoque. Unde $f\ fa$ ut ac $b\ fa$ re sol tantum tenent, sed $\# mi$ insuper $mi$ obtinet quintam. Sic, cum ad $e\ la\ mi$ acutum pervenit, $\# mi$ et $e\ la\ mi$ ut $mi$ sol $la$ tenent. Sed $b\ fa\ la$, quia quinta, $mi$, quoniam octava, perfectis carebit. Unde vulgatum est a practicis $mi$ contra $fa$ nec e contrario in specie perfecta numquam fiendum; in imperfectis autem bene, quia recipiunt maioritatem et minoritatem. Errant tamen in hoc per defectum, quoniam illud idem et de aliis potest dici vocibus, ut paulo post ostendemus.

by a semitone, but the other [is distant] by a tone, and in a similar way the signs between them are not distant by means of a diapente as the hexachords themselves or, if you prefer, the gammas. Whence, the argument on this does not proceed in the same manner.

Therefore, one should take care, both on these and others, when it happens in such a manner, that the perfect consonance is not placed on the second of those signs.$^{191}$ Thus $b\ mi$ will only have $re$ [and] $la$--the third above and below. But the same always should be done on the position or, if you prefer, the sign $b\ fa \# mi$, which holds a double position, since it holds the first perfect gamma with $fa$, but the second [gamma] with $mi$. Likewise also at their octaves. We arrange the third gamma in this way: Descending a diatessaron from the second [gamma], one arrives at $\Gamma$ ut. Therefore, just as gamma to gamma is held, thus also the signs will have been placed by the same difference. Whence, as the second [gamma is] on $d\ sol\ re$, the third [gamma is] on a re, and on others also. Whence, $f\ fa$ ut and $b\ fa$ only hold $re$ [and] $sol$, but [with] $\# mi$ moreover, $mi$ holds the fifth. Thus, when one arrives at high $e\ la\ mi$, $\# mi$ and $e\ la\ mi$ hold ut,
Cum autem quartum gamma ex istis componere velis, a tertio diapente intensa in d sol re cadit; unde signa diapente distantia easdem consonantias habebunt. Nam sicut in tertio est a re, ita et in quarto e la mi, quia re, fa, la. Sed cum b mi ac f fa ut diapente non differant, f fa ut perfecta carebit. Sed quartum in $\sharp$ mi sicut tertium in e la mi, quia ut, re, fa, la; b fa autem perfectis carebit.

Quod si quintum creare gamma procuras, diatessaron ab isto

mi, sol, la. But b fa will lack the perfect [species] la, because it is the fifth, and mi because it is the octave. Whence, it is common knowledge among the practicing musicians that mi should never be made against fa in the perfect species, nor vice-versa; however, it is acceptable in the imperfect [species], because they receive [the quality of] major and minor. Nevertheless, they err in this by their deficiency, since the same thing can also be said about the other notes, as we will show a little later.

When you wish to make the fourth gamma from these, a diapente ascending from the third [gamma] falls on d sol re; whence, the signs at a distance of a diapente will hold the same consonances. For just as there is a re in the third gamma, likewise also [there is] e la mi in the fourth [gamma] because of re, fa, la. But since b mi and f fa ut do not differ by a diapente, f fa ut will lack the perfect [species]. But $\sharp$ mi is to the fourth gamma as e la mi is to the third [gamma] because of ut, re, fa, la; however, b fa will lack the perfect [species].

But if you attempt to create a fifth gamma, you may descend a diatessaron
remittas, quod a re notatur. Igitur signa, quae diatessaron distant, easdem consonantias habebunt. Unde sicut quartum in e la mi, ita quintum in b mi et in alii eodem modo distantibus. Sed in $\sharp$ mi quintum habebit, quod quartum in e la mi tenuit acuto. At tamen $b$ fa, quia nulli proportionatur in istis duobus hexachordis sive gammatibus, ideo maxime ab omnibus differt, quoniam tantum habebit mi fa sextam maiorem atque minorem et in alio ab illis compositas.

Cumque sextum hexachordum creare procures, a primo diatessaron intendas, quod inter a re $b$ mi locatur coniuncta. Ergo sicut $\Gamma$ ut in primo, ita $c$ fa ut in sexto. Et sic de allis locis diatessaron distantibus, et sicut $f$ fa ut $b$ fa ut $mi$, $fa$, $la$. Sed $\sharp$ mi perfectis carebit.

Quod si septimum gamma iam completere desideras, quartam a sexto intendas, quae inter e la mi ac $d$ sol re cadet. Signa ergo, quae diatessaron ab isto from this [fourth gamma], which is marked a re. Therefore, the signs which are distant by a diatessaron will have the same consonances. Whence, just as the fourth [gamma is] to e la mi, thus the fifth [gamma is] to b mi, and in the same manner with the other distances. But the fifth [gamma] will hold on $\sharp$ mi that which the fourth [gamma] held on high e la mi. But nevertheless, $b$ fa, since it is not related to these two hexachords or, if you prefer, gammas, differs the most of all, since it will only hold mi [and] fa—the major and minor sixth—and in another place, the compounds from these.

And when you attempt to create the sixth hexachord, you ascend a diatessaron from the first [gamma], because this coniuncta is arranged between a re [and] $b$ mi. Therefore, just as $\Gamma$ ut is to the first [gamma], thus $c$ fa ut is to the sixth [gamma]. And likewise concerning other positions with the distances of a diatessaron, and $b$ fa is as $f$ fa ut, [containing] ut, $mi$, $fa$, $la$. But $\sharp$ mi will lack the perfect [species].

But if you desire to complete the seventh gamma, you ascend a fourth from the sixth [gamma], which will fall between e la mi and $d$ sol re.
Si altiora distarent, taliter se habebunt: ergo, sicut c fa ut in sexto, ita f fa [59] ut in septimo et sicut sextum in f fa ut, ita septimum in b fa, quia utrobique ut, mi, sol; sed ♯ mi cassus perfectis mi solam tenebit.

Therefore, the signs, which would be higher from this [sixth gamma] by the distance of a diatessaron, will be considered in this manner: Consequently, as c fa ut is to the sixth [gamma], so f fa ut is to the seventh [gamma], and as the sixth [gamma] is to f fa ut, thus the seventh [gamma] is to b fa, because on both [there is] ut, mi, sol; but ♯ mi lacking the perfect [species] will hold only mi.

Sic enim inspectis documentis poteris omnia gammata sine labore compleere. Nec credas hoc superflue positum, si documenta Guidonis necessaria ponis tu, qui sequeris ipsum. Nam et crebrius veniunt semitonia subintellecta quam realia, quibus cavendum est a perfectis, nisi per istas coniunctas suppleantur. Unde bene componentes videbis immediate signare. Sed bene quidem a parte superiori perfici gammata possunt modo praedicto. Dices verum ab inferiori, qualiter sit tibi documentum generale. Unde aspicias pro unoquoque loco implendo eius octavam et habita formatione praedicta habes intentum. Quod si simplices fuerint, videlicet unisonus, tertia, [quarta], quinta, sexta, octava, rendebunt hoc modo: pro sexta [tertiam], pro octava [unisonum] realiter semper habebis, sed pro [quarta]
[quintam] et e contra.

Unde animadvertas oportet, quod, si in signo composito habes fa, quintam in componendo sequentem vocem accipias scilicet sol, quoniam illud fa [quarta] vox est. Sic et de aliis vocibus faciendum, ut in gammate secundo c fa ut carenti aspecto c sol fa ut ut mi fa la perornato habebimus c fa ut ut mi sol la adimpletum. Sed scias oportet ut, cum pro mi fa est accipienda, poni non debere; sed ille locus quinta carebit, ut in eodem gamma ℓ mi re mi sol compositum est. Sed b mi solas re sol obtinebit, quoniam fa, quae loco mi erat accipienda, diapente non est. Sed a la mi re ut re fa la, a re vero ut mi fa la; sic et Γ ut re mi sol, quia g sol re ut ut mi sol obtinere visum est. Sic ergo habes completum gamma secundum. Sicut enim istud gamma completum est, ita et alia complenda tibi relictuo. Item notandum est, quod, quemadmodum locus componendus caret diapente, cum fa pro mi est accepturus, ita cum compositus cassus sit perfecta, quia mi componendus obtinebit ut in gammate [quarto], scilicet d sol re, locus c sol fa ut caruit mi quinta, quoniam contra fa fieri non potuit. Ideo tantum re sol obtinuit, verum c fa ut re fa sol sibi vendicat inhaerere.

Sed si contingat la each position, and you have an end with the above-mentioned formation maintained. But if they are simple [species]—namely, the unison, the third, [the fourth], the fifth, the sixth, [and] the octave—they will render them in this way: In reality, you will always have the third for the sixth, the unison for the octave, the fifth for the fourth, and vice-versa. Whence, it is necessary that you pay attention, because if you have fa on the compound sign, you take the following note—that is, sol—when composing the fifth, since that fa is the fourth note. Likewise also, it should be done with the other notes, so that [when] c fa ut is observed to be lacking in the second gamma, having added ut, mi, fa, la to c sol fa ut, we will have ut, mi, sol, la added to c fa ut. But it is important for you to know that when fa must be taken for mi, it should not be placed [there]; however, that position will lack the fifth, just as in the same gamma re, mi, sol is composed on ℓ mi. But b mi will only hold re [and] sol, since fa—which is not a diapente—should have been taken in place of mi. But a la mi re [holds] ut, re, fa, la and a re [holds] ut, mi, fa, la; thus also Γ ut [holds] re, mi, sol, because g sol re ut has
quintum compositum locum habere, componendus
carebit eadem, quoniam ultima la nulla vox est in
ista doctrina confusa. Cum igitur alia gammata
componere velis, signis 8 comparatis idem eveniet,
ac etiam in complemento idem faciendum. Quae
omnia in subiecta figura continentur.

been seen to hold ut, mi, sol. Therefore, in this
manner you have completed the second gamma. For
just as this gamma is completed, thus also I leave the others to be
completed by you. Also, it should be noted that just as [that] place about
to be composed is lacking the diapente whenever fa
is going to take the place of mi, thus also when it is composed it is without
the perfect, because mi, which is about to be composed, will hold ut on
the fourth gamma--that is, d sol re--the place where c sol fa ut lacked the
fifth--mi, since [mi] was not able to be made against fa. Therefore, it only held re [and] sol;
but c fa ut claims to adhere for itself re, fa, [and] sol. But if it turns out that la has
composed a fifth place, [that which] is about to be composed will lack the
same, since the last la is not a note in this confused doctrine.
Therefore, when you wish to compose other gammas, the same will happen with
the eight signs provided, and the same should also be done in the complement.
All these things are contained in the figure below [see Figura 8].

From this it is clear that neither fa nor ut can be made against re, even though the third and the
seventh gamma [are] on a re. And it is clear from
comparatione tertii hexachordi ad f fa ut. Sic et aliae voces contra alias in diversis hexachordis fieri non poterunt, quod diligenti lectori relinquimus indagandum.

Animadverte igitur, lector, quanta a sequacibus Guidonis secuta mira videntur. Totum istud tamen asservendi potest recte intelligentibus nostram doctrinam. Ipsi autem, postquam doctrinam unius gammatis cognoscunt, multa se scire arbitrantur, nedum cum duo ut ab uno in alium invicem.

a comparison of the third hexachord with respect to f fa ut that neither re nor la can be made against fa. Thus also, some notes cannot be made against others in different hexachords, which we leave to be investigated by the diligent reader.

Therefore, notice reader, what great miracles seem to have followed from Guido's followers. Nevertheless, all this can be helpful to those who understand our teaching. However, after [Guido's followers] are acquainted with the doctrine of one gamma, they believe themselves to know a great deal; however, [they will know] much more when [they become acquainted with] two as [they move] in turn from one to another.
<table>
<thead>
<tr>
<th></th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>e la</td>
<td>20</td>
<td>19</td>
<td>17</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>d la-sol</td>
<td>20</td>
<td>19</td>
<td>17</td>
<td>16</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>c sol-fa</td>
<td>19</td>
<td>17</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>b fa</td>
<td>17</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>a la-mi-re</td>
<td>17</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>g sol-re-ut</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>f fa-ut</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>e la-mi</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>d la-sol-re</td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>c sol-fa-ut</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>b mi</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>b fa</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>a la-mi-re</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 29. Figura 8 of the Musica practica, 60.
<table>
<thead>
<tr>
<th></th>
<th>g sol-re-ut</th>
<th>f fa-ut</th>
<th>e la-mi</th>
<th>d sol-re</th>
<th>c fa-ut</th>
<th>b mi</th>
<th>a re</th>
<th>l^1 ut</th>
<th>Gammata septem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8 6 5</td>
<td>3 1 3</td>
<td>6 5 3</td>
<td>6 5 3 1</td>
<td>5 SUB 3</td>
<td>3 SUB</td>
<td>3 SUB</td>
<td>6 5 3 1</td>
<td>3 SUB 3</td>
</tr>
<tr>
<td></td>
<td>re fa sol</td>
<td>re fa la</td>
<td>re fa la</td>
<td>re fa la</td>
<td>1 3 5 6</td>
<td>1 3 5 6</td>
<td>1 3 5 6</td>
<td>re fa la</td>
<td>1 3 5 8 augment</td>
</tr>
<tr>
<td></td>
<td>0 6 5 3</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
<td>6 3 re sol</td>
</tr>
<tr>
<td></td>
<td>ut mi fa la</td>
<td>3 SUB 3</td>
<td>5 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
</tr>
<tr>
<td></td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
</tr>
<tr>
<td></td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
<td>ut mi sol</td>
</tr>
<tr>
<td></td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
<td>3 SUB 3</td>
</tr>
</tbody>
</table>

Figure 29. --continued--

370
TERTIA PARS, IN QUA DE NUMERIS HARMONICIS COPIOSE PERTRACTATUR

TRACTATUS PRIMUS

CAPITULUM PRIMUM

Binas longas maximam binasque breves longam atque brevem duas semibreves, sed et semibreven duas minimas intra se continere iam liquido monstravimus per geometricam demonstrationem in prima parte tertio tractatu capitulo de notulis. In ista vero parte, quae tota numerorum est, qualiter eadem nota tres aut plures possit valere dicendum restat. Consideratione temporis accepta, quae in pulsus noscitur palpitatione, scire nos oportet, utrum duplari aut triplari aut quadruplari eam contingat aut etiam dimidiare aut trifariam sive quadrifariam dividere.

Prima enim consideratio modus dicitur non a modulando vel a movendo, ut supra dictum est, sed a temporum modificatione vel computacione dictum arbitramur. Secundum vero magistrum Franconem est

THIRD PART, IN WHICH THE HARMONIC NUMBERS ARE COPIOUSLY TREATED

FIRST TREATISE

FIRST CHAPTER

We have already clearly shown by means of a geometric demonstration in the chapter about the notes [that appears] in the first part, the third treatise, that the maxima contains two longs within itself, the long contains two breves, the breve contains two semibreves, and the semibreve contains two minims. Certainly in this part, which is entirely [dedicated to] the rhythms, it remains to be discussed just how the same note can be worth three or more [values]. With the consideration of the tempus understood (which is recognized in the beat of the pulse), it is necessary for us to know whether it is concerned with being doubled or tripled or quadrupled, or also being divided into two, three or, if you prefer, four parts.

For the first consideration is called modus, not from modulari or movere, as it was said above, but we believe that it is named from modificatio or the computation of the
coniunctio soni
temporisque longis notulis
mensurati, quod nihil
aliud est quam quod modus
est coniunctio
proportionis, quae
consurgit ex notis longis
et brevibus viam mensurae
mensurando scilicet tempus
ipsum.

Prolatio enim a
proferendo, quia, cum
tempus dividitur in
partes, melius profertur,
ut in versuum contingit
scansione. Egidius vero
de Marino dicit, quod ideo
dicitur prolatio, quia
tempus [dividitur] in
partes minuiores, ut
melius proferatur; nam
absurdum esset, ut ait,
quod potest pronuntiari
non posse scribi.

Inde in hac parte tertia
numerorum species habemus
tres, ut sit modus, tempus
et prolatio. Et sicut
modus potest duplicari,
ita prolatio medio dividi.
Cum igitur modos
coniungimus invicem, modum
maiorum appellamus. E
contra vero, cum prolatio
secatur, maior prolatio
nuncupatur. Si enim
tempus pro unitate in
medii digitii ponamus
summitate, modus in indice
correspondebit ex augmento
minoris prolazioni in medio
posita ex divisione. Sic
tempus. Indeed,
according to the master
Franco, it is a
conjunction of the sound
and of the tempus measured
by long notes, because the
modus is nothing other
than the conjunction of
the proportion which rises
out of longs and breves by
measuring the means of the
measure, that is, the
tempus itself.

For the prolatio [is
taken] from
proferendo, because
when the tempus is divided
into parts it is better
articulated, as it occurs
in the scansion of verses.
Truly, Egidius de Marino
days that it is called
prolatio for this reason,
because the tempus is
divided into smaller
parts, so that it may be
better articulated; for as
he says: "It would be
absurd that what can be
sung cannot be
written."

Whence, in this third
part concerning the
rhythms, we have three
species—that is, the
modus, the tempus, and the
prolatio. And just as the
modus can be doubled, thus
the prolatio [can be]
divided in half.
Therefore, when we unite
the modi in relation to
one another, we call it
the modus maior. But on
the other hand, when the
prolatio is divided, it is
called the prolatio maior.
For instance, if for
unity's sake we arrange
et in pollice modus maior, 
in auriculari prolatio 
maior recte collocabuntur 
et cum maxima rei 
similitudine.

Supra quidem tactum est 
notulam simplicem dici 
temps. Modus ergo minor 
habebit longam, maior vero 
maximam, quae duplex longa 
a plerisque est appellata; 
prolatio minor semibrevem, 
qua et minor est 
nuncupata, sed maior 
minimam, post quas 
scilicet odas ponitur 
punctus augmentans, 
dividens aut reducens; 
post quam diminutae 
notulae scilicet 
[semiminima], [cursea], 
[minarea], fusea. Harum 
autem nomina et quot modis 
unaquaeque notula 
figuretur, in capitulo de 
notulis latius diximus.

Hic vero strictim et per 
modum corollarii earum 
notitiam breviter 
ostendemus, quorum 
cognitio a brevi procedit. 
Quae notula est quadrata [62] 
sic W; sed si ad latus 
dextrum tractum in sursum 
aut deorsum habuerit hoc

the tempus on the apex of 
the middle finger, the 
modus will correspond on 
the index [finger] on 
account of the 
augmentation to the 
prolatio minor [which is] 
placed on the middle 
[finger] according to the 
division. Thus also the 
modus maior will be 
properly arranged on the 
thumb, and the prolatio 
maior [will be arranged] 
on the little finger; and 
[this is done] with the 
greatest similitude of the 
theory.

Certainly the simple 
sign called tempus was 
touched upon above. 
Therefore, the modus minor 
will have a long, but the 
[modus] maior will have a 
maxima which is called a 
duplex long by many 
[people]; the prolatio 
minor will have a 
semibreve,197 which is 
also called minor, but the 
[prolatio] maior will have 
a minim, after which—that is, [after these] figures 
—a point is placed [for 
the purpose of] 
augmenting, dividing, or 
reducing; after this the 
diminished [signs] are 
placed—that is, the 
semiminim, the cursea, the 
minarea, [and] the fusea.

However, in the chapter 
concerning the signs we 
have discussed the names 
of these [signs] in 
greater detail, and [we 
have also discussed in] 
how many ways each sign is
modo \( \text{H} \), efficitur longa. Quod si longae corpus fuerit duplicatum sic \( \text{H} \), maxima nuncupatur a modernis; ab antiquis rectius duplex longa dicebatur. Hoc enim accidit in augmento ipsi brevi. Quod si ab angulo in angulum secetur diametraliter hoc pacto \( \text{a} \), duae semibreves efficiuntur, quae ab antiquis minores dicebantur, sic \( \text{d} \). Verum si semibrevis in sursum aut deorsum habuerit tractum sic \( \text{d} \); efficitur minima. Quod si minima fuerit denigrata \( \text{At} \), semiminima; quae, si ad caput si retorta \( \text{At} \), cursea sive cursuta aut crocea, quae, si fiat sic \( \text{At} \), [minarea], quae, si hoc modo \( \text{f} \), fusea est appellata. Et isto modo omnes notulae cognoscuntur, verum semibrevis, brevis et longa aliis modis. Dabimus igitur modum longam et semibreven cognoscendi, et sic brevis cognoscetur, quae diversis et variis modis figuratur in ligaturis.

represented. But here, superficially and by means of a corollary, we will briefly show a notion of those [signs] whose recognition proceeds from the breve. The sign [of the breve] is square in this way \( \text{H} \), but if it has a line above or below on [its] right side in this way \( \text{H} \), a long is made. But if the body of the long has been doubled in this way \( \text{H} \), it is called a maxima by the moderns; [although] it was more correctly called a duplex long by the ancients.\( ^{198} \) For this occurs in an augmentation to the breve itself. But if it is divided diametrically from angle to angle in this way \( \text{a} \), two semibreves are made, which were called minor [semibreves] by the ancients, such as \( \text{d} \). Truly, if a semibreve contains a line above or below in this way \( \text{d} \), a minim is made. But if a minim has been colored black \( \text{d} \), a semiminim [is made]; on the chance that it is twisted at the top [like this] \( \text{d} \), it is called a cursea or, if you prefer, a cursuta, or a crocea; if it is made in this way \( \text{d} \), [it is called] a minarea; if [it is made] in this way \( \text{d} \), [it is called] a fusea. And in this manner all of the signs are
acknowledged; however, the semibreve, the breve, and the long are [also] acknowledged in other ways. Therefore, we will give the method of recognizing the long and the semibreve; and likewise the breve, which is represented with ligatures in diverse and various ways.

The ligature of two or more notes having the first [note] higher than the following [note and] lacking a line from the left part above or below is called a long. But if any of these conditions are absent, it will not be a long. Indeed, if it is not square or if it is higher or lower--lacking any line--it is always a long. But the last [note] will be called a long if it has contrary conditions. Example:

\[ \text{\begin{tabular}{c|c|c|c|c}
\hline
 & & & & \\
\hline
\end{tabular}} \]

But the ligature of two or more notes in arsis or thesis--of squares or not, or of the first square and of the others not--having a line ascending from the left side, are called semibreves even though the first two will always be alone. Example:

\[ \text{\begin{tabular}{c|c|c|c|c|c}
\hline
 & & & & & \\
\hline
\end{tabular}} \]

Therefore, we will mark the longs with the letter \( I \), but we will indicate the semibreves with the sign \( s \), so that when we
find similar ligatures in the songs after that, we may easily recognize which ones are longs and which ones are semibreves. But the remaining figures, which will be neither semibreves nor longs, are left to be breve. Nevertheless, some may doubt—and not without reason—why these signs are named in this way. We will say: because the tempus is a breve, the sign of the tempus is called a breve. Whence because "a thousand years in Thy sight are like yesterday, which has already gone by." Truly, the long [receives its name] because it is greater than the breve. And the semibreve has [its] name on account of the fact that a breve is divided into two semibreves, but when [a breve is divided] into three [semibreves] they are called minor [semibreves]. But the maxima and minim were named by comparison. For when the breve is placed into the positive in respect to degrees, it is called great. But if [the breve is] great, it is necessary for the long to be greater, and thus the maxima follows as the superlative. Yet the same breve is called small with respect to the long and the maxima. But if [the breve is] small, the semibreve is smaller, and the minim follows as the superlative.

The names of the fractions were invented by the moderns; therefore, they are not of much authority. Inasmuch as it may be called a semiminim because it is half a minim, thus also the cursea is derived in a similar way from cursus; [it is called] the minarea--that is, the minim area--because it is lesser in value than the preceding [values]. But some [people] name the fusea according to the resemblance of [its] figure, because it is made in the manner of a spindle; but others [name it thus] because we weave a song by circling with fuseas. But enough concerning these things, and those things [which] we have spoken of in the chapter about the notes.

And now, so that we may be able to understand the value of these signs, it should be known by us that we make use of three rhythms in this part, namely: perfect, imperfect, and diminutive. [The rhythm] is perfect when the sign is of the value of the three following [notes], [it is] imperfect when it contains [the value of] two, [and it is] diminutive when it is placed on behalf of only one of the [notes] that follows. We say that the number three is perfect--not by persuasion or comparison--[but] as Johannes Muris says,
comparationem aliquam probare. [Ista] mutatio terna corporis, dimensio linearum aliquantulum est naturalis. [Sed] tamen eam etiam improbanus, quoniam eodem modo senarius prior et perfectionem dici poterit, quia sex punctis terminatur et punctum prius est in mathematica abstractione. [Ratio] vero, quam tradimus nos, mathematica est, scilicet [quod] perfectus numerus dicitur ternarius, quoniam partibus aliquotis et quotis simul sumptis est aequalis. Excedit ergo senarium in perfectione; nam pars quota dicitur quaelibet pars infra ipsum numerum contenta, quod omnis ergo pars aliquota potest dici quota, non tamen et contra. Quando igitur aliqua in aliis scientiis debent probari, ad mathematicas necesse est recurrant demonstrationes, quoniam hic demonstratur, illic autem comparatio sufficiet. Illi igitur, qui in musica perfectionem dicit per comparationem, perfectionem suam auferunt ab ea. Haec de numero perfecto.

"because the number three is [found] in the divine and intellective soul."202 For in the mathematical disciplines it is [considered] a defect to prove something by comparison. That triple mutation of the body—a dimension of lines—is somewhat natural. But nevertheless, we also reject it, since by the same method the number six will be able to be called better and more perfect because it is limited by six points, and [because] the point is first in mathematic abstraction. But the reason that we teach that it is mathematic—that is, [the reason] that the number three is called a perfect number—is because it is equal to the aliquot and quota parts taken together. Therefore, the number six exceeds in perfection; for whichever part is contained below the number itself is called a quota part. Wherefore, every aliquot part can be called a quota, nevertheless, the opposite is not [true]. Therefore, when something must be proven in other sciences, it is necessary for them to resort to mathematic demonstrations. Since it is demonstrated here, a comparison will be sufficient there. Therefore, those who say that there is perfection in music by comparison take its perfection away.
Imperfectus autem numerus dicitur binarius, quia per unitatem distat a perfectione; sed diminutus, quia per binarium, qui vix numerus dici deberet, nisi quia in hac facultate notulae franguntur, et per respectum ad duas medietates verum tenebit. Aliter autem in arithmetica ponitur numerus triplex: perfectus scilicet, superflius et diminutus per comparationem ad partes aliquotas. Unde senarius, cuius partes aliquotae sunt 1. 2. 3, quae simul iunctae senarium implent nec excedunt, dicitur perfectus. Sed 12, cuius partes 1. 2. 3. 4. 6 simul sumptae suum totum excedunt, superflius habetur, diminutus numerus 10, quia eius partes scilicet 1. 2. 5 ad totius summam non accedunt, et 8 similiter, cuius partes scilicet 1. 2. 4 septem non excedunt. Itaque omnis inaequalitas aut in maioribus, aut in minoribus terminis consideratur. Illi enim immoderata quodammodo plenitudine proprii corporis quantitatem partium suarum numerositate excellunt. Illos autem velut paupertate inopes oppressosque quadam naturae suae inopia minor quam ipsi sint partium from it. [But] enough about the perfect number.

Now the number two is called an imperfect number, because as a unit it is far from perfection; but [it is] diminutive because by means of the number two (which hardly ought to be called a number except in this instance), the notes are divided, and certainly it will hold in respect to the two halves. However, in arithmetic the triple number is arranged in another way—that is, perfect, superfluous, and diminutive by comparison to [its] aliquot parts. Whence, the number six is called perfect whose aliquot parts are 1:2:3, which joined together complete the number six and do not exceed [it]. But [the number] 12, whose parts taken together exceed its whole—1:2:3:4:6—will be held superfluous; the number 10 is diminutive because its parts—that is, 1:2:5—do not reach the sum of the whole, and similarly [with the number] 8, whose parts—that is, 1:2:4—do not exceed seven. For that reason, every inequality is considered either in major or minor limits. For those [limits], in a certain unrestrained plenitude of their proper body, excel in number the quantity of their parts. However, those [limits], as by poverty—powerless and

oppressed by a certain weakness of their nature—are composed of the sum of the parts lesser than themselves. But enough of these things. Now let us consider the differences of the rhythms.
CAPITULUM SECUNDUM
IN QUO SIGNA PER QUAE [NUMERI] DISTINGUUNTUR

Therefore, for a true knowledge of these rhythms, let us explain some signs which have been invented by the ancients from the geometric figures. Then we will add others which the moderns propose. A quadrangle with three lines was established for the *modus perfectus* in this way \[\text{\textdagger}\], and with two [lines] for the [*modus imperfectus*] in this way \[\text{\textdagger}\]. But a \(\circ\) with three points in the middle was established for the *tempus perfectum* with *prolatio perfecta* in this manner \(\odot\), and a \(\text{\textc c}\) with two points in the middle [was proposed] for the *tempus imperfectum* with *prolatio imperfecta* in this manner \(\text{\textc c}\). But if a \(\text{\textc c}\) [was established] with three [points] in this way \(\text{\textc c}\), the *tempus* was imperfect and the *prolatio* was perfect. But if a \(\circ\) [was established] with two [points] in this way \(\odot\), the *tempus* was believed to be perfect and the *prolatio* was thought to be imperfect.
Alii vero figurabant
Indorum figuris hoc modo
\[\frac{3}{3} \frac{3}{3},\] inferi\orum denotans
tempus, superior vero
prolationem. Nostri vero
contemporanei partim
geometricis partim Indorum
utuntur figuris; namque
unum modi cum tempore
ponunt, aliud vero
temporis cum prolatione,
utrumque vero
quadrisepulcit factum.
Modi cum tempore sic
\[O \frac{3}{3} C \frac{3}{3} O \frac{2}{2} C \frac{2}{2},\] sed
temporis cum prolatione
hoc modo \[\frac{O}{C} \frac{C}{O} \frac{C}{C} .\] Hic
modus signandi hac ratione
compertus est, quia
circulus figura perfecta
perfectam denotat speciem.
Sed cum duae circuli
tantum partes ponuntur,
duas illius speciei partes
amissa tertia denotant.
De hoc vero signo 3 vel de
isto 2 non est ambiguitas:
primum esse perfectum,
secundum vero imperfectum.
In primo etenim signo
quadripartito circulus aut
semicirculus modum
ostendunt minorem, 3 aut 2
tempus. Subtilis igitur
lector per ea, quae
posuimus, sive modi sive
temporis perfectionem
poterit invenire. In
secundo vero signo, quod
in alio modum, in hoc
tempus designat, si enim
punctus in centro ponatur,
\[O \frac{3}{3} C \frac{3}{3} O \frac{2}{2} C \frac{2}{2},\] prolationis demonstrat
perfectionem; quod si non,
imperfectionem. Ita et in
semicirculo, ut patet in
figuris. O3 figura modi
cum tempore, C figura
temporis cum prolatione.

Truly, other [people]
represented [them] with
the figures of the Hindu's
in this way: \[\frac{3}{3} \frac{3}{3} \frac{3}{3} ,\]
[with] the lower [number]
denoting the tempus and
the upper [number]
denoting the prolation.
But our contemporaries use
the geometric figures in
part and the figures of
the Hindu's in part; for
they arrange one with the
tempus of the modus, but
the other with the
prolation of the tempus,
both made in four ways:
[that] of the modus with
the tempus in this way
\[O \frac{3}{3} C \frac{3}{3} O \frac{2}{2} C \frac{2}{2},\] but [that]
of the tempus with the
prolation in this way
\[\frac{O}{C} \frac{C}{O} \frac{C}{C} .\] This manner
of designating is
established for this
reason, because the
circle--a perfect figure
--denotes the perfect
species. But when only
two parts are arranged
within the circle, they
denote two parts of that
species with the third
[part] missing. Truly,
there is no ambiguity
concerning this sign 3 or
this [sign] 2, [for] the
first is perfect and the
second is imperfect.
Indeed, in [regard to] the
first sign with four
parts, the circle or
semicircle indicates the
modus minor; the 3 or the
2 [indicates] the
tempus. Therefore,
the discerning reader will
be able to find the
perfection of the modus or
of the tempus by those
Has igitur figuras sic dispositas hac ratione repperimus; quia contrarias numerorum passiones inter se custodientes cognovimus. Nam in primo signo quadripartito signum superius, [quod] sinistram tenet legentis, et temporis et modi perfectionem affirmat. In sua vero contraria modi, qui universalior est, perfectio denegatur idemque in subcontrariis reperitur. Inferius vero, quod dextram tenet legentis, contrarias omnino recipit passiones. Sic et sinistrum inferius contra dextrum superius; nam id quod negatur in una, affirmatur in alia sua contradictoria et e contra. Quodsi utrumque negatur in una, ambo things which we have established. Indeed, that which designates the modus on the first sign [that is divided into four parts], designates the tempus on this second sign [that is divided into four parts], for if the point is placed in the center it demonstrates the perfection of the prolatio; but if not, it [indicates] imperfection. Likewise also with the semicircle, as it appears in the figures. 03 is a representation of the modus with the tempus; 0 is a representation of the tempus with the prolatio.

Therefore, we have found that these figures were arranged in this manner for this reason, because we have recognized the opposites [while] observing the proportions of the rhythms among themselves. For on the first sign [that is] divided into four parts, the upper sign which is to the left of the reader, confirms both the perfection of the tempus and [the perfection] of the modus. But on its opposite [side], which is more universal, the perfection of the modus is denied, and the same is found on the opposite [sides] below. But the lower [sign], which is to the right of the reader, receives entirely opposite proportions. Likewise
affirmantur in altera sua contradictoria. Subalterrane vero poterunt dici, eo quod modus, qui universalior est, idem esse [videtur]. Sic et de alio signo quadripartito dicendum est, ut patuit in figuris.

Verum quia in hac parte quidquid per varias fractiones diversasque diminutiones canitur ad quandam certam integritatem determinatamque mensuram reductur, scire nos oportet per signa diversa, in quibus notulis mensuram integrum debemus tenere. Mensura enim, ut diximus, est illud tempus sive intervallum inter diastolen et systolen corporis eucraton comprehensum. De cuius inaequali alteratione insurgunt inaequales musicae proportiones, de quibus paulo post dicturi sumus. Cum igitur cantor recte et commensurate cantare desiderat, instar pulsus istius pedem aut manum sive digitum tangens in aliquem locum canendo moveat. Et cum per primum cecinerit signum quadripartitum, mensuram also the lower left [sign] opposite the upper right [sign]; for what is negated on one [sign] is confirmed on the other--its contradictory--and vice-versa. But if both are negated on one [sign], both are confirmed on the other--its contradictory. And they will be able to be called subalterns because the modus, which is more universal, appears to be the same. Likewise also it should be said concerning the other sign [that is] divided into four parts, as it was revealed in the figures.

Certainly, in this part it is necessary for us to know by means of different signs on which notes we must have the entire measurement, since whatever is sung by various divisions and diverse diminutions is reduced to a certain proven integrity and a determined measurement. For as we have said, the measurement is the tempus or, if you prefer, the space--eucraton--comprehended between the diastole and the systole of the body. From its variable alteration arise variable proportions of music, which we are going to speak about a little later. Therefore, when the singer wishes to sing correctly and commensurately, while singing he may move the foot or the hand or, if you prefer, the finger,
istam ponat in brevi; tunc
enim longa in istis O3 O2
tribus temporis morulis
mensurabitur, in istis
vero C 3 C 2 duabus.
Duplex vero longa in his
O3 O2 sex, sed in istis
C 3 C 2 4 tantum valebit.
Ipsa vero mensura in istis
duobus O2 C 2 per medium
in duo tantum semibreves
secatur quatuorque
minimas. In istis vero
O3 C 3 aequaliter in tres
dividitur semibreves sex
quoque minimas, nisi
comparatio inaequalis fiat
cum tenore, quoniam tunc
insurgit quaedam
inaequalitatis habitudo,
de qua in proportionibus
dicemus.

Sin vero per secundum
cecinerit signum
quadripartitum, morulam
ponet in semibrevi et tunc
brevis tres mensuras
valebit in istis O O,
duas vero tantum in his C
C; et sicut in aliis
divisa fuit aequaliter in

touching upon some place
[for] the value of that
pulse. And when he has
sung according to the
first sign [that is]
divided into four parts,
let him place this
measurement on the breve;
for then with three
divisions of the tempus,
the long will be measured
on these [signs] O3 O2,
but with two [divisions of
the tempus the long will
be measured] on these
[signs] C 3 C 2. And the
duplex long on these
[signs] O3 O2 will be
worth six, but on these
[signs] C 3 C 2 it will
only be worth four.
Indeed, the same
measurement on these two
[signs] O2 C 2 is divided
in half [resulting] in
merely two semibreves and
four minims. But on these
[signs] O3 C 3 it is
equally divided into three
semibreves and also six
minims, unless the
comparison is made unequal
with the tenor, since then
a certain condition of
inequality arises, which
we will discuss [in the
section] on the
proportions.205

And if one sings
according to the second
sign [that is] divided
into four parts, he will
place the division on the
semibreve, and then the
breve will be worth three
quantities on these
[signs] O O, but only two
on these [signs] C C; and
duas aut in tres
semibreves, ita in istis
[in] duas minimas aut in
tres, prout signum
perfectionem aut
imperfectionem denotat,
dividetur. Sic et in 4
aut in sex semiminimis, et
istud est, quod
frequentius observatur.

Aliquando autem propter
cantus nimiam diminutionem
cantores mensuram, quae in
brevi erat observanda,
onunt in semibrevi, et si
erat in semibrevi tenenda,
transferunt illum in
minima taliter, quod iam
pro maiori parte omnes
tenent et scribunt in
compositione pro hoc signo
© vel hoc C, quod
mensurae morula in minima
teneatur integra. Et si
in tenore signum diversum
ab aliis ponatur, ut si ©
in tenore et hoc © in
aliis, minima tenoris
tantum valet, quantum
aliarum valet semibrevis,
quia morulam integram, et
si in aliis istud ©
ponatur, quantum brevis.
Et istud servat
[Ockeghem], Busnois, Dufai
et Johanis de Monte et
alii viri in hac facultate
famosi. Tinctoris vero
viam veritatis ignorans
quaedam ponit, quae in
lucem non essent
deducenda. Verum in
proportionibus aliqua
dicam de eis, ne rectus
ordo perturbetur
ignorantis opinione.
Namque Busnois et isti
just as in the others it
was divided equally into
two or three semibreves,
thus on these it will be
divided into two or three
minims as the sign denotes
the perfection or
imperfection. Likewise
also into four or into six
semiminims, and this is
what is observed more
frequently.206

However, sometimes on
account of the excessive
diminution of a song, the
singers place the
measurement, which should
have been observed on the
breve, onto the semibreve,
and if [the measurement]
should have been held on
the semibreve, they pass
that onto the minim in
such a way which they all
hold to now for the
greater part; and in
composition they write
according to this sign ©
or this [sign] C, because
the entire division of the
measurement is contained
in the minim. And if a
sign is placed in the
tenor distinct from the
others, as for example if
© [or] C [is placed]
in the tenor and this [sign]
© [is placed] in the
other [voices], the minim
of the tenor is worth as
much as the semibreve of
the other [voices], since
it is worth an entire
division; and if this
[sign] ©2 is placed in
the other [voices], it is
[worth] as much as the
breve.207 And this
magni viri fundantur in antiquitate; et sicut quantitas ex uno latere crescendo augmentatur, sic ex alio dividendo minuitur. Si enim antiqui ponebant mensuram in brevi, in longa et quandoque in maxima, ita nos in brevi, semibrevi et aliquando in minima. Sed de mensuris hactenus. Nunc de perfectione aliarum specierum dicamus.

[procedure] is observed by Ockeghem, Busnois, Dufay, Johannes de Monte, and other famous men in this discipline. But Tinctoris, ignorant of the path of truth, establishes certain things which should not be brought to light. Lest the correct order be disturbed by the opinion of an ignoramus, I will say something about them [in the section] on the proportions. For Busnois and these great men base their ideas upon antiquity, and just as the quantity is augmented by increasing from one side, thus [the quantity] is diminished by dividing from the other [side]. For if the ancients placed the measurement on the breve, on the long, and at times on the maxima, thus we [will place the measurement] on the breve, the semibreve, and at times on the minim. But enough about the measurements. Now let us speak about the perfection of the other species.
CAPITULUM TERTIUM
IN QUO SIGNA
ALIARUM SPECIERUM

Restat, quoniam sumus
numeros in omnibus
speciebus divisuri,
perfectum ab imperfecto in
modo prolationeque
maioribus, quibus figuris
distinguatur, declarare.
Hoc autem melius
assequemur, si prius
pausarum notitiam, quam in
prima parte posuimus, ad
memoriam breviter
revocemus. Quarum quidem
cognitio sicut in notulis
ab ipsa incipit temporis
pausa, quae a linea in
lineam totum spatium
implens figuratur hoc modo
= . Quae si duo vel
[trea] spatia occupet sic
= , pausa longa dicitur;
si vero quatuor spatia
amplectitur hoc modo
= , pausa maximae, ultra quam
nulla maior. Appellatur
et pausa generalis, quando
generaliter omnes
adveniente ita cantu non
terminato quiescunt. 
Appellatur quoque finalis,
quoniam semper in fine
cantus ponitur. Quod si
pausa brevis dividatur,
medietas, quae a linea
pendet superiori, est
semibrevis; si pars vero,
quae ab inferiori
erigitur, pausa minimae
nuncupatur. Quae si ad
caput sit hoc modo cousins

THIRD CHAPTER
IN WHICH THE SIGNS OF
THE OTHER SPECIES
[ARE TREATED]

Since we are going to
distribute the rhythms
within all the species,
there remains [for us] to
explain by which figures
the perfect is
distinguished from the
imperfect in the modus
maior and the prolatio
maior. However, we will
understand this better if
first we briefly recall to
memory the concept of the
rests which we established
in the first part. Indeed,
a knowledge of the rests--
as in the notes--begins
with the rest of the
tempus itself which is
represented [by] filling
the entire space from line
to line in this way: = .
If this occupies two or
three spaces in this way
= , it is called a long
rest; but if it
encompasses four spaces in
this way = , [it is
called] a maxima rest--
beyond which there is
nothing greater. It is
also called a general
rest, when everyone rests
as a group at such a pause
occurring in a song that
has not ended. It is also
called final, since it is
always placed at the end
of a song. But if the
breve rest is divided, the

388

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
retorta, pausa
semiminimae nominatur.
Aliarum vero [fractionum]
ob nimiam sui brevitatem
pausa non reperitur.
Verum quidam ut Johannes
Urede, [carissimus] noster
regis Hispaniae capellae
magister, pausas posuit
curseae hoc modo
perscriptas $\frac{1}{2}$ fundatus in
hoc, quod notulis accidit.
Semiminima enim, si caput
habet retortum efficitur
cursea, medietas scilicet
minimae. Quod si cursea
dupliciter sit retorta,
efficitur minarea $\frac{1}{2}$,
medietas scilicet curseae.
Sic igitur de pausa
fiendum: quia, si pausa
minimae ad caput sit
retorta, efficitur
semiminimae; ergo si bis
sit retorta, curseae. Nos
autem illud posse fieri
non negamus, quia ratione
fundatum arte cognovimus,
verum non debuisse fieri
conclusimus, quia, cum
notula illa tantae sit
levitatis, quaevis potest
in cantu comprehendi,
quomodo in pausatione
spiritus in ea quiescit.
Non ergo illud esse
fiendum concedimus, sed
evitandum fore proponimus.

half which hangs down from
the upper line is a
semibreve; but if it is
the part which is erected
from the lower [line], it
is called a minim rest.
But if it is twisted at
the top in this way C, it
is called a semiminim
rest. But a rest is not
found for the other
fractions due to their
excessive brevity.
Nevertheless, certain ones
[have done] as Johannes of
Urreda, our dearest
friend [and] Kapellmeister
for the King of Spain,
[who] established rests of
the cursea written down in
this manner: $\frac{1}{2}$, based
upon that which happens
with the notes. For if
the semiminim has [its]
top twisted, a cursea is
produced—that is, half of
a minim. But if the
cursea is twisted twice, a
minarea is produced $\frac{1}{2}$—
that is, half of a cursea.
Therefore, the [rhythmic]
rest should be done in
this way, because if a
rest of a minim is twisted
at the top, [a rest] of a
semiminim is produced;
accordingly, if it is
twisted twice, [a rest] of
cursea [is produced].
However, we do not deny
that it can be done,
because we have recognized
that it is based in theory
upon [principles of] art,
but we have concluded that
it should not be done,
since that note is of so
little consequence—as
[when] one rests while
pausing for a breath—it
cannot be detected by
anyone in the song. Therefore, we do not concede that it should be done, but rather we propose that it ought to be avoided.

His ergo pausis sic cognitis facile perfectionem et imperfectionem in alii speciebus cognoscimus. Cum enim tres pausas longae positas simul aut una praecedente alias duas simul vel omnes tres solutas in aliquo cantu inspexerimus, procul dubio maiores modum et exinde maximam longas tres valere via artis intelligimus. Quod si binae ponantur et binae, imperfectum esse iudicamus. Verum si eadem pausa longae tria occupet spatia, minorem perfectum et ex hoc longam tres breves valere arte cognoscimus; imperfectum vero, si duo tantum occupet spatia. Sic ergo minore existente imperfecto maior perfici poterit et e contra sicut in aliis signis. Perfectio etiam temporis pausae brevium denotatur aliter secundum nos, aliter vero secundum antiquos, quoniam, ut ait magister Franciscus, si pausa temporis occupat totum spatium, totum tempus denotat perfectum. Sin vero duas spatii partes occupaverit, duas temporis partes demonstrat; si autem tantum unam, uniam partem morulae, quia unam minorem ostendit. Neoterici vero

Therefore, now that we have become acquainted with these rests, we [can] easily recognize the perfection and imperfection in the other species. For when we have observed three rests of a long placed together within some song, or one [rest] preceding another two together, or all three [rests placed] separately, without doubt we understand that it is the modus maior via artis, and thus the maxima is worth three longs. But if two [rests] are established and then two more, we conclude that it is imperfect. Furthermore, if the same rest of a long occupies three spaces, we recognize the modus minor perfectus via artis, and according to this a long is worth three breves; but if it only occupies two spaces, it is the [modus minor imperfectus. Thus the [modus] maior will be able to be perfected from the existing [modus] minor imperfectus and vice-versa as with the other signs. Certainly, the perfection of the tempus with the rests of the breves is indicated by one way according to us, but by another way according to the ancients, since, as...
non sic, sed, quando duas temporis tertias volunt insinuare, duas pausas semibrevis unam iuxta aliam hoc modo = disponunt; et tunc perfectum esse tempus recte cognoscimus, quia totam pausam brevis tres minores valere intelligimus, ex quo ibi duae tertiae et non tota integra posita sunt. Nam quando tempus est imperfectum, pausa temporis tantum valet quantum pausae duarum semibrevium. Ad quid ergo deberent poni duae sic =, si una hoc modo = sufficeret? Frustra fit per plura, quod potest fieri per pauciora.

Eodem modo deducitur de prolacione perfecta, quoniam, si duae pausae minaeae hoc modo = reperiantur, perfectam [denotas] prolacionem, etiam si alius non fuerit signum. Nam quando

the master Franco says:
"If the rest of the tempus occupies an entire space, it denotes a whole perfect tempus. But if it occupies two parts of a space, it demonstrates two parts of the tempus; however, if [it occupies] only one, [it indicates] a single part of the division, since it expresses minor." But the moderns do not [arrange it] in this way, for when they desire to work in two-thirds of the tempus, they arrange two rests of the semibreve—one next to the other in this way =; and then we properly understand that the tempus is perfect, because we comprehend that the entire rest of the breve is worth three minor [semibreves], since two-thirds have been placed there rather than the entire whole. For when the tempus is imperfect, the rest of the tempus is worth as much as the rests of two semibreves. Therefore, for what reason should two be placed in this way =? if one would be sufficient in this way =? For there is no real purpose for things to be done by many means which can be done by fewer means.

Concerning the prolatio perfecta, it is deduced in the same way, since, if two rests of a minim are found in this way =, you denote the prolatio perfecta even if there has not been another sign.
prolatio est imperfecta,
tantum valet pausa
semibrevis sic =
quantum duae pausae
minimae hoc modo =,
igitur sicut de tempore
figurandum. Et per quod
perfectio aut imperfectio
in maiori prolatione
distinguatur, non omnibus
cantoribus constat nec
musicis quibusdam ut
Tristano de Silva amico
nosto, qui crassam
Iohannis de Muris
opinionem affirmat dicens
prolationem perfectam esse
maiorum imperfectamque
minorem. Quam et
antiquorum auctoritate et
novorum provectorum
exemplo et mathematica
demonstracione volumus
improbare primum sic:

Egidius de Marino de
minima tractans ait
merito: tertiam debet
amittere partem, punctum
vero, quia nihil habet sub
se, tantum medietatem. Si
igitur minima tertiam
potest amittere partem,
quaeo, quid aliud quam
semiminima illa pars
tertia est? Tres ergo
tertiae totum integrum
implent. Relinquitur ergo
minima tres semiminimas
posse valere, quod patet
exemplo Io. [Ockeghem] in
missa [L'homme arme], ubi,
quando debebat semiminimas
duas pro una minima
scribere, ut volunt
cantores cum musico

For when the prolatio is
imperfect, the rest of a
semibreve is worth as much
in this way = as two
rests of a minim in this
way =; therefore, it
should be represented just
as the tempus [was
represented]. And it is
not known by all the
singers how the perfection
or imperfection is
distinguished in the
prolatio maior, nor [is it
known] by some musicians,
such as our friend Tristan
de Silva, who affirms the
vulgar opinion of Johannes
de Muris [by] saying:
"The prolatio perfecta is
major and the [prolatio]
imperfecta is minor." We
wish to reject this, first
with the authority of the
ancients and [then] with
an example and
mathematical demonstration
of the progressive
moderns.

Egidius de Marino [in]
dealing with the minim,
says with merit: "[The
minim] should throw away
the third part, but the
point, since it holds
nothing below itself,
[should] only [throw away]
the half." Therefore, if
the minim is able to throw
away the third part, I
ask: What is that third
part other than a
semiminim? Therefore,
three thirds complete an
entire whole.
Consequently, it remains
that a minim can be worth
three semiminims which
appear in Johannes
Ockeghem's example in the

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Tristano de Silva, ponit minimas evacuatas ad caput retortas hoc modo quas diximus appellari curseas. Ex quo musicî speculantur minimam tres valere semiminimas, sedum quia auctoritas ipsius Egidii et antiquorum clare incontrarium monstratur, cum dicit: sunt et aliae figuræ, quæ vocantur minimæ imperfectae hoc modo factae et habent maiorem effectum quam semiminima, quia sunt plenæ, et minorem effectum, quam si caput haberent erectum. Ex quibus verbis patet, quod nos e converso facimus nigrum scilicet pro albo ponentes, cum pro minim duas ponimus albas curseas, ut ipse Io. [Ockeghem] facit, quia maioris valoris est haec alba quam ista nigra. Si curseae duas minimam implent, semiminimas tres fore necessarias mathematicè vero probatur, supposito quod ipsimet faciunt, scilicet quod mensura in prolatione perfecta ponatur in minimæ. Si enim integra temporis morula in minimæ est et tempus perfectionem et imperfectionem recipiat, sequitur ipsam minimam quandoque in duas, quandoque in tres partes aequales dividit posse; quod si non, nec semibrevis, cum ponitur in ipso, nec brevis eadem ratione.

Mass L’homme arme, where he places hollow minims twisted at the top in this way (which we have said are called curseas) when he should have written two semiminims for one minim, as the singers along with the musician Tristan de Silva desire. From this, musicians speculate that a minim is worth three semiminims, not to speak of [the fact] that the authority of Egidius himself and of the ancients is clearly shown to be to the contrary when he says: "There are also other figures which are called imperfect minims made in this way, and they have a greater effect than the semiminim, because they are filled [in] and [have] a lesser effect than if they had an erect top. From these words it is clear that we do the opposite—that is, placing the black for the white when we place two white curseas for a minim, as Johannes Ockeghem himself does, because this white [sign] is of greater value than this black [sign]. If two curseas complete a minim (indeed it is proven mathematically that three semiminims are going to be necessary), it is assumed that they do the same—that is, that the measurement in the prolatio perfecta is established on the minim. For if the whole division
Aliis autem modis illa
duo signa quadripartita a
quibusdam perfigurantur
antiquis ut puta modi cum
tempore sic Ō Ō O Ō C C.
Hic autem modus ab
illo non differt; nam id,
quod denotatur per 3,
patefacit Ō, et quod
intelligimus per 2, per C
cognoscimus. Si igitur
haec signa in prima
disponantur figura, idem
erit, quod fuit in illa.

However, those two signs
that are divided into four
parts are represented by
certain ancient
authorities in other ways;
consider this example:
[the signs] of the modus
with the tempus [are
represented] in this way:
Ō Ō O Ō C C C C.
Moreover, this method does
not differ from that
[which we have already
discussed]; for what is
indicated by [the number]
3 reveals a Ō, and what
we understand by [the
number] 2, we recognize by
means of C. Therefore,
if these signs are
arranged in the first
figure, [the result] will
be the same as it was in
that [figure].

But others, such as my
teacher Johannes de Monte,
who was the first to
instruct me in the
rudiments of music, said
that a sign should not be
placed to the side as we
have arranged [ours], and

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
he conceded that one should be placed below the other in this way

\[ O \circ C \circ C, \text{ or, if the geometric figures are mixed with the characters of the Hindu's, in this way }\]

\[ O \circ C \circ C \]

way 3 3 2 2; nevertheless, [it should be done] in such a manner so that, basing our theory upon that of the ancients, the sign of those [characters] above may take the place of the earlier [sign] of the others.\footnote{218} For if they arrange the tempus with the prolatio in this way \[ \frac{3}{3} 2 2 \], (since 3 is nothing other than \( O \) and \( C \) is nothing other than \( 2 \)), it seems reasonable that we may do [this] in a similar way concerning the modus with the tempus. But he [Johannes de Monte] said that the tempus with the prolatio—which we said should be represented in this way \( O \circ C \circ C \)—should be arranged in this way \( O \circ C \circ C \), since then the prolatio is properly shown enclosed within the tempus [and] the perfection and imperfection of both is recognized in a clearer manner. But we have told him that the first method is more precise.

Basing [our theory] upon this, we have proven with a geometric demonstration that via naturae each note

\[ O \circ C \circ C \]

\[ O \circ C \circ C \]

\[ O \circ C \circ C \]

\[ O \circ C \circ C \]

\[ 3 3 2 2, \] ita tamen ut superius signum istorum teneat vicem prioris aliorum antiquorum ratione [fundati]. Nam si ipsi disponunt tempus cum prolatione hoc modo \[ \frac{3}{3} \frac{3}{3} \frac{3}{3} \text{, cum nihil aliud sit } 3 \text{ quam } O \]

\[ \text{nec } C \text{ quam } 2 \text{, rationabile videtur, ut similiter de modo cum tempore faciamus. Tempus vero cum prolatione, quod diximus sic figurandum } O \circ C \circ C, \]

\[ \text{dicebat sic esse ponendum } \frac{C}{\circ G} \circ C \circ C \text{, quoniam tunc recte monstratur prolatio intra tempus reclusa; perfectio et imperfectio utriusque clariori modo cognoscitur. Nos vero diximus illi primum modum esse subtiliorem.} \]

\[ \text{Fundati enim in hoc unamquamque notulam duarum sequentium valorem tenere natura geometrica} \]
demonstratione probavimus. Cum igitur aliud signum non reperiretur contrarium, natura sua canendus est cantus, scilicet per binarium numerum. At cum via artis ternarium facimus, aliquo signo perscribimus, ita quod, etsi notula duas tantum valebat natura, per artem facimus tres. Cum igitur alterum istorum O C ponimus signum, prolatio, quoniam signum eius non est, imperfecta iudicatur. Cum vero signum idest punctum in medio circuli aut semicirculi ponitur, perfectio circuli designatur prolacionis perfectionem denotantis.

Magister vero Robertus Anglicus proprietatem notularum in geometria ignorans contrarium dicebat, hoc est: quando signum temporis non reperitur, perfectum esse tempus arbitrabatur. Omnes fere cantus signis carentes male compositos esse dicebat. Ipse enim inscius doctrinae artem praeponebat naturae, cuius contrarium manifestum est, quia ars imitatur naturam in quantum potest. Non tamen dicitur, quod natura artem imitetur, cum saepe artem aberare videmus, naturam vero raro vel nunquam.

has the value of the two following [notes]. Therefore, when another sign would not be found to the contrary, the song should be sung according to its nature—that is, by a binary number. But when we make [it] ternary via artis, we write [it] with another sign in such a manner that even if by nature the note was only worth two, by means of art we make [it worth] three. Therefore, when we place one of these signs—that is, O C—the prolatio is considered to be imperfect, since there is no sign for it. But when a sign is set down—that is, a point in the middle of a circle or a semicircle—the perfection of the circle indicates the perfection of the designated prolatio.219

But the teacher Robertus Anglicus, unaware of the property of the figures in geometry, said the opposite—that is: "When the sign of the tempus is not found, the tempus was thought to be perfect." He said that for the most part all of the songs lacking signs are poorly composed. For he himself, ignorant of the doctrine, placed art before that of nature, to which it is clearly shown to the contrary, because art imitates nature inasmuch as it is able. Nevertheless, it is not said that nature imitates
art, since we often see
art go astray, but rarely
or never [do we see]
nature [go astray].

However, in addition, we
distinguish the perfect
from the imperfect with
other signs; consider this
example: if black notes
are found in some song
among white [notes]
without a union nearby, it
is the sign which is set
down as black that
dismisses the third part.
Therefore, it would not
have a third part unless
it were worth three.
Consequently, when we find
black notes without a
union nearby, we say that
the species of those
[notes] is perfect.
Nevertheless, notice that
we say "without a union
nearby," since, if some
black [notes] follow it in
such a manner that three
are established in the
place of two, it is not
clearly distinguished.
For this can occur in
both—that is, in the
perfect number and in the
imperfect [number]. But
earlier musicians and
singers were accustomed to
portraying black notes
where we place our white
ones, and red [notes]
where we place our black
ones. They also placed
white ones— that is, notes
which are] hollow in the
middle— just as we make
ours— that is, only when
they did not have the
color red on hand, as
Egidius de Marino prefers
to do. But Ugolino,
factum repperimus umquam, a nullo esse fiendum censemus.

Alio etiam modo secundum magistrum Franconem perfectum discernebant ab imperfecto antiquiores ponentes scilicet supra notulas binarias b, supra ternarias vero t; et sic clare ostendebatur valoris notularum differentia. Sed cum notae modi imperfecti de tempore canebantur perfecto et notae modi perfecti de tempore imperfecto, priores signabantur b, binaria scilicet [divisione] inventae; sequentes vero figurabantur circulo oppositum scilicet praecedentium denotante.

Sicut igitur errant per defectum, qui sine aliquo signo perfectam eam speciem male praevidentes diiudicant, sic etiam per excessum, qui, cum uno possit dignosci perfecta, aliud subiungunt; ut, si who did not properly examine these facts, placed black, red, and hollow notes in the same song, since it seemed to him that the black [notes] were perfect, but the red [notes] were imperfect, and the hollow notes were diminished. But we do not think that this should be done by anyone, since we have not found it to have ever been done by any other [person].

According to the master Franco, the ancients also distinguished the perfect from the imperfect by another way--that is, [by] placing [the letter] b above binary notes [and the letter] t above ternary [notes]; and thus the difference in the value of the notes was clearly shown. But when the notes were sung in the modus imperfectus with the tempus perfectum, and in the modus perfectus with the tempus imperfectum, the first [notes] were marked [with the letter] b--that is, acquired by a binary division; but the latter [notes] were represented with a circle--that is, denoting the opposite of the preceding [notes]. Therefore, just as those who, lacking foresight, err by defect [when they] decide that the species without any sign is perfect, thus also, those who add another [sign] err by excess, since the
in cantu pausa longae tria occupet spatia, errant qui hoc signum $O_2$ adiungunt, sic et, si [pausae binae] semibrevis hoc modo = reperiantur, superflue ponitur istud $O$, vel hoc $O$, si minimae pausae sic disponuntur =, maxime si utrumque reperiatur, quoniam aliter posset quis dicere ad id quod defuit denotandum positum fuisse. Haec de figuris hactenus.

perfect can be distinguished by one [sign].\(^{224}\) For example, if a rest of a long occupies three spaces within a song, they err who add this sign $O_2$; likewise also if two rests of a semibreve are found in this way =, [then] this $O$ or this $O$ is placed superfluously if minim rests are arranged in this way =; especially if both are found, since otherwise, anyone could say it was placed for the purpose of indicating that which was lacking.\(^{225}\) This is enough concerning the figures.
IN QUO CANONES ET SUBSCRIPTIONES SUBTILITER DECLARANTUR

Tacite praetermittendum esse non arbitror, si quis auctor velit sub cantu, per quod perfectum aut imperfectum vel diminutum possit sine aliguo signo dignoscì, aliquid subscribere vel etiam, si aliter signatum fuerit per canonem aut subscriptionem, contrarium ediscere. Dicitur enim subscriptio, quia semper sub tenore scribitur, canon vero, quia est quaedam regula voluntatem componentis sub quadam ambiguitate obscure et in enigmate insinuans, ut in missa Se la face ay pale, ubi ponitur Crescit in triplo et in duplo et ut iacet. Quandoque etiam canon docet cantare per contrarium; incipientes a fine in principio finiunt, ut fecit Busnois: Ubi alpha ibi omega et ubi omega finis esto. Etenim nos simile clandestinis verbis in quodam carmine posuimus dicentes: In voce quae dicitur contra, contra sic canitur. Canone mutatur etiam locus, ut Busnois: Ne sonites c a c e fa tono, [sume] lichanos hypaton. Notula enim prima est in g, quae lichanos est meson, et tamen canon ponit illam in d, qui

I do not believe that it should be quietly overlooked if any composer wishes to write something below the song, by means of which the perfect or the imperfect, or even the diminished can be distinguished without any sign; or also if the song has marked in another way by means of a canon or a subscription [in order] to learn [the song] to the contrary. For it is called a subscription because it is always written below the tenor; and [it is called] a canon because there is a certain rule insinuating the will of the composer, obscurely and enigmatically with a certain ambiguity, as in the Mass Se la face ay pale where Crescit in triplo et in duplo et ut iacet is established. At times the canon also teaches [one] to sing in retrograde, [for] beginning from the end, they end at the beginning as Busnois did [in] Ubi alpha ibi omega et ubi omega finis esto. Indeed, in a similar manner we established [the same thing] in a certain song with secret words, saying: In voce quae dicitur contra, contra sic canitur.
locus est lichanos hypaton.

Mutatur etiam canone modus procedendi, ut tantum, quantum vox debet elevari, [deprimatur], ut fecit Busnois: Antiphasis thenorizat ipos, dum epiptonzizat, cuius sententia est: fiat subtus, quod supra erat fiendum et e contra. Similiter: Ibi thesis assint ceptra, ubi arsis et e contra, ubi in tantum vox elevatur, in quantum deprimenda videbatur. Aliquando ex una voce aliae insurgunt in fuga aut in unisono vel in diatessaron aut diapente etiam in diapason, ut diximus nos in quodam versu magnificat: Fuga duorum unisona numero salvato perfecto. Est enim tantum vox una et post morulas sex in eodem sono eam sequitur altera. Diximus etiam in missa, quam [Salmantiae] compositusum, dux Boetium in musica legeremus: medietas harmonica fiat et quaelibet vox suum numerum salvet. Praecedit enim prima vox, alia vero octo pausatis in unisono sequitur illam, quae non canitur.\textsuperscript{228} The position is also changed by a canon, as [in this song of] Busnois‘: Ne sonites c a c e fa tono, sume lichanos hypaton.\textsuperscript{229} For the first note is on g, which is the lichanos meson; and nevertheless, the canon places it on d, which is the position of the lichanos hypaton.

By means of a canon, the method of proceeding is also changed, so that the voice is lowered as much as it should have been raised, as Busnois did [in] Antiphasis thenorizat ipos, dum epiptonzizat, whose meaning is: "Let there be done below what should have been done above and vice-versa." Similarly [in the song] Ibi thesis assint ceptra, ubi arsis et e contra,\textsuperscript{230} where it seemed that the voice should be lowered as much as it is raised. At times, other [voices] arise from one voice in the fugue, either at the unison, the diatessaron, the diapente, or even at the diapason, as we ourselves have sung in a certain verse of [our] Magnificat: Fuga duorum unisona numero salvato perfecto.\textsuperscript{231} For there is only one voice [in this song], and after six divisions a second [voice] follows it on the same sound. We have also sung Medietas harmonica fiat et quaelibet vox suum numerum salvet\textsuperscript{232} in the Mass.
habet proportionem cum [alia], ad quam fieret relatio. Quam sequitur alia post sex inchoans in diatessaron inferius. Alia vero quatuor spectando inchoat diapente sub ista, diapason vero sub prima. Et sic quatuor flumina ex uno fonte emanabant. Sed in moteto Tu lumen, ubi posuimus:

In perfectione minimorum per tria genera canitur melorum, quod Bononiae, dum publice legeremus, composuimus, insinuavimus quamlibet [voculam] per syllabas in lineis et spatiis denotatas 6 mensuras valere, sicut si hoc Ὀ esset signum, quoniam pausa temporis in principio ponitur, et ideo unaquaeque syllaba unum tempus denotat. Quae vero sint tria genera melorum, diximus in prima parte tractatu 4. Nam canitur ter: prima vice notula secunda elevatur a prima per trihemitonium, in secunda vice per tonum et in tertia per semitonium.

which we composed in
Salamanca while we were lecturing on Boethius's [views] on music. For the first voice goes before, and after eight rests another [voice], which does not have a proportion with the other, follows it at the unison, creating a relationship with it. Another [voice] follows after six [rests], beginning on the diatessaron below. But another [voice] waiting for four [rests], begins the diapente below this, [creating] a diapason below the first [voice]. And thus four rivers were emanating from one source. But in the motet Tu lumen where we have established In perfectione minimorum per tria genera canitur melorum (which we composed while we were lecturing publicly in Bologna), we recommended that any note be worth six measurements by means of syllables designated on lines and spaces, just as if this were the sign: Ὀ, since a rest of the tempus is established at the beginning and on that account each syllable indicates a tempus. And [the results] are the three genera of melody that we have mentioned in the first part, the fourth treatise. For it is sung three [different] ways: on the first time, the second note is raised above the first by a
Alios vero quam plurimos canones terminis musicae utentes composuimus. Hoc enim maiores nostri consueverunt facere, ut suam doctrinam et intelligentiam demonstrarent. Quos indocti imitari volentes canones ponunt sua fantasia fulcitos, quorum nullum hic ponam, ut memoria careat, quod non est imbutum doctrina.


However, we have composed many other [songs] by using canons with musical terms. For our ancestors were accustomed to doing this so that they could demonstrate their knowledge and their intelligence. The untrained, wishing to imitate these [men], establish canons supported by their own fantasy. [However], I will not place any of these here, so that there may be no memory of that which is not imbued with knowledge.

But others appropriate a method of procedure to the sacred scripture, such as [the song] Descendant in profundum quasi lapis. The abyss in music is any voice's lower octave. But [it should be done] to the contrary when one sings Suspendimus organa nostra. We also have established as many canons as possible by attributing [them] to sacred scripture as in Requiem aeternam238 [where] we insinuate [in] the canon Ut requiescant a laboribus suis that ut and re are silent, but that they may sing the rest [of them]. However, although they may be silent with regard to melody, nevertheless, we calculate the value of the

trihemitone; on the second time [it is raised] by a tone; and on the third [time it is raised] by a semitone.
paranete neteque
synemmenon; illorum
scilicet opera
[sequuntur] illos, illas
notulas in canone priori
dimissas esse resumendas
intimatur. Itaque nota,
qua fuit dimissa in ut,
notulam in ut positam
sequatur, et quae in re
quevit, post notulam re
laborando reclamet, ut
verba consonent rebus. Et
cum ex superioribus
habeamus paraneten
synemmenon esse k in
coniuncto, neten vero l in
eodem, sequitur, quod
opera illorum sequuntur
illos in diapente
reclamando. Et sic, cum
notulae in secunda parte
sic disponantur f g h,
debet facta operum
additione f k g l l h
cantari, ita quod valor
praecedentium notularum
integre resumatur. Sic et
in alio, ubi diximus: Ut
quiescat, donec optatus
veniat, volumus ostendere:
notula, qua fuerit in f
scilicet, quae dicitur ut
per vulgarium dictiones,
quiescat idest sileat
numerando, donec ad finem
fuerit perventum. Sed cum
in parte sequenti diximus:
Et sicut mercenarii dies
eius, ut supra volumus
ostendere, id, quod
inconcinnum remansit in
prima, in paraneten
synemmenon resumatur in
secunda, ut in alio
fecimus canone Ad modum
mercenarii, cuius dies in
falio ad satisfactionem in
aliis computantur.

notes in the rests. Yet
when Si tenes cum domino
Agamemnon, de capite
nullos amites capillos in
paranete neteque
synemmenon; illorum
scilicet opera sequuntur
illos omnes is sung,
it announces that those
notes dismissed in the
first canon should be
taken up again. Therefore,
the note that was
dismissed on ut may follow
the note placed on ut, and
that one which rested on
re reclaims [it] by
laboring after the sign
re, so that the words
correspond with the
events. And since we have
paranete synemmenon from
the upper [strings] to be
k in the conjunct
[tetrachord], but nete to
be l on the same, it
follows that their efforts
follow them by reclaiming
[it] on the diapente. And
thus, when notes in the
second part are arranged
in this way--f g h--[and]
the addition of their
labors have been made, it
should be sung f k g l l
h, so that the value of
the preceding signs are
completely resumed.
Likewise also in another
[canon] where we sang Ut
quiescat, donec optata
veniat, we desire to
show that the note which
will be on f, namely that
which is called ut through
the utterances of ordinary
[singers], rests--that is,
it is silent--while
counting until it has
arrived at the end. But
when in the following part
we sang *Et sicut mercenarii dies eius*\textsuperscript{243}
as we wish to show above—that which remained
awkward in the first
[part] may be resumed on
paranētē synēmmēnōn in the
second [part], as we have
done in another canon
[called] *Ad modum mercenariī*\textsuperscript{244} whose days
in deceit are calculated
to satisfaction in others.

---

But it is clearly shown
when *Ne recorderis*\textsuperscript{245} is
sung that re is not placed
on the string. And we
understand the same thing
concerning re and mi when
we establish [the song]
*Neque reminiscaris*;\textsuperscript{246}
nevertheless, with the
divisions to be sung
having [already] been
calculated. But in the
next to the last song,
when we sing *Requiescant in pace*,\textsuperscript{247} we clearly
show that re should not be
established in the song
nor on a rest; but with it
having been dismissed
intact, we may pass on to
another voice. And when
*Amen* is sung in the last
[voice], we understand
that it should be done in
the same way.

---

We have seen many canons
of others and we have
established as many as
possible ourselves. Truly,
since the knowledge
concerning the particulars
will not be able to be
retained, or if some small
part always remains
confusing, may [these]
words concerning the
canons be sufficient for sharpening and refining the wits of talented men.
TRACTATUS [SECUNDUS]
CAPITULUM PRIMUM
IN QUO DE TRIPICI PROPORTIONALITATUM GENERE SUBTILITER DISPUTATUR

Sicut igitur ex numerorum multiplicatione relata proportionum genera redundarunt, ita proportionum commixtione perspecta proportionalitas concreatur. Est enim proportio duorum numerorum ad se invicem habitudo. Proportionalitas autem est duarum proportionum ad se invicem relatio. Cum igitur hucusque de proportionibus aliqua fuerimus perscrutati, restit, ut de proportionalitatibus ad huius primi voluminis complementum quaedam practicis necessaria discutiamus.

Proportionalitas haec secatur in continuam et separatam. Est enim continua, cum numerus medius bis sumitur ad extrema comparatus, ut 4. 6. 9. Diximus enim: sicut se habet 4 ad 6, ita 6 ad 9, quia sesqualtera est utrobiique. Cum autem non unus sed duo medi sunt numeri, dicitur separata aut discontinua,

Therefore, just as it is said that the genera of ratios flow forth freely from the multiplication of the numbers, thus it is clearly perceived that the proportion is created by the mixture of the ratios. For a ratio is the reciprocal relationship between two numbers. However, a proportion is the reciprocal relationship between two ratios. Therefore, since up to this point we have examined some aspects concerning the ratios, in order to complete this first volume there remains for us to discuss certain things about the proportions that are necessary for the practicing musicians.

This "proportion" is divided into continuous and separated. For it is continuous when the mean number is taken twice in comparison to the extremes, such as 4:6:9. For we say: just as 4 is to 6, thus 6 is to 9, because there is a sesquialter [proportion] in both. However, when there are not one but two
ut in his numeris 4. 6. 8. 12 fit discursus hoc modo:
sicut se habet 6 ad 4, ita 12 ad 8. Si igitur terminos permutamus, concludimus sic: ergo sicut 8 ad 4, ita 12 ad 6. In primo enim discursu sesqualtera utrobique, in conclusione vero dupla.

Si igitur hoc modo in vocibus arguere voluerimus, quatuor voces ex monochordo, quae hoc modo se habeant, sumere debemus. Sint autem a c d f, in quibus discursum faciemus hoc modo: sicut a ad c, ita d ad f. Permutatis vero litteris concludimus: ergo sicut a ad d, ita c ad f. In antecedente trihemitonii est ambarum intercapedo, sed diatessaron in consequenti utriusque proportionis est intervallum. Possunt et in hac disiuncta proportionalitate plures iungi proportiones, ut in his numeris 2. 3: 4. 6: 8. 12, et tunc fit discursus hoc modo: sicut 2 ad 3, ita 4 ad 6 et 8 ad 12, quia in omnibus sesqualtera proportio custoditur. Coniungendo vero numeros minores a maioribus separatos concludimus hoc modo:

mean numbers, it is called separated or discontinuous, as for example with these numbers, 4:6:8:12, a discourse is made in the following manner: just as 6 is to 4, thus 12 is to 8. Therefore, if we exchange the terms, we conclude in the following manner: consequently, just as 8 is to 4, thus 12 is to 6. For in this first discourse the sesquialter [proportion is found] in both, but in the conclusion [the proportion is] dupla.

Therefore, if we wish to make it clear with the notes in this manner, we should take four notes from the monochord that relate to one another in this way. Moreover, let there be these notes, a c d f, with which we will make a discourse in the following manner: just as a is to c, thus d is to f. But when the letters are exchanged we conclude [the following]: consequently, just as a is to d, thus c is to f. In the first situation, the interval of both [ratios] is that of a trihemitone, but in the following situation, the interval of both ratios is a diatessaron. Several ratios can also be joined in this disjunct proportion, as for example in these numbers: 2:3, 4:6, 8:12, and then the discourse is made in this manner: just as 2 is to
ergo sicut 2. 3. 4 inter se, ita 6. 8. 12 inter se.
Et in vocibus hoc pacto, si sint c d e f et g h,
arguimus: sicut c ad f, ita d ad g, sic et e ad h;
nam in omnibus diatessaron est consonantia.
Coniunctis autem primis vocibus tribus a superioribus separatis
concludimus: ergo sicut c d e inter se, ita f g h inter se. In omnibus enim
his tonus differentiam facit. Multis et variis etiam aliis modis ista
proportionalitas variatur, de quibus paulo post idest volumine secundo latius
dicemus. [74]

Rursus ea, quae continua est, triplicem recipit variationem: aut enim
technorum excessus consideratur aut in utrisque proportio,
conspicitur aut excessuum et terminorum comparatio
coaequatur. Prima enim

3, thus 4 is to 6, and 8 is to 12, because the sesquialter ratio is
preserved in every [interval]. But by combining the smaller
numbers separated from the larger [ones], we conclude
in this manner: consequently, just as 2:3:4 [are related] among
themselves, thus 6:8:12 [are related] among themselves. And if the
notes are c d e f and g h, we argue with the notes in
this way: just as c is to f, thus d is to g,
likewise also e [is in relation] to hj for the consonance of the
diatessaron is in every [interval]. However, when
the first three notes are combined [and then]
separated from the upper [three notes] we conclude
[the following]: consequently, just as
c d e [are related] among themselves, thus f g h [are related] among
themselves. For in all these [notes], the tone
makes the difference.
Still, this proportion is varied in many and various
other ways, which we will discuss a little later in
more detail—that is, in the second volume.

Again, that which is continuous receives a
threefold variation: for either the excess of the
numbers is considered, or the ratio is observed in
both, or the comparison of excesses and of terms is
equalized. For the first
arithmetica est, secunda geometrica dicitur. Tertia vero dulcem ac delectabilem facit harmoniam. His igitur tribus discussis huic primo practicorum volumini finem imponemus.

Therefore, when we find three continuous numbers or [three numbers] separated by an equal distance, we will say that an arithmetic proportion is among them, as in these numbers: 1:2:3. For with the same quantity by which the mean surpasses the smaller [term], [the mean] is exceeded by the larger [term]—that is, by means of unity. Therefore, it is an arithmetic proportion, since the equality of excess is observed and not [the equality] of proportions. Similarly, there is a difference of two in these numbers: 2:4:6, and [a difference] of three in these [numbers]: 3:6:9; and successively according to this order. Anyone adhering to such steps by the same similitude will not be led to error. Nevertheless, on account of this mean it is noted that it is necessary for larger ratios to be found in the smaller terms [and] for smaller comparisons [to be found] in the larger [terms], as for example in these [numbers]: 4:6:8. In the
smaller terms the sesquialter [proportion] is found, but in the larger terms the sesquitertian [proportion is found].


But [now], let the geometric mean that follows this be explained. It alone, or rather to a very large extent, can be called a proportion because the speculation is placed on the same ratios of the terms in the larger as well as in the smaller --where certainly an equal ratio of the numbers is always kept with the disregarded quantity--for it is contrary to the arithmetic mean. For example: the duple [proportion] is [found] in both of these: 1:2:4 or 6:12:24. Likewise also with the triple [proportion], as for example in these: 1:3:9 or 2:6:18; and similarly with the quadruple [proportion] and the rest. However, the property is noted in this proportion, because the ratios are always equal in larger or smaller terms.
CAPITULUM SECUNDUM

IN QUO MEDIETAS
HARMONICA DISCERNITUR

Harmonica vero medietas est, quae neque eisdem differentiis neque aequis proportionibus constituitur, sed illa, in qua, sicut maior numerus ad minimum se habet, sic differentia maximi et medii contra differentiam medii atque minimi comparatur, ut in his terminis 3. 4. 6.

Senarius enim quaternarium sua tertia parte superat idest binario, quaternarius vero ternarium sua quarta idest uno, quare in his neque eadem proportio terminorum reperitur neque eadem differentiae inveniuntur. Est autem quemadamodum maximus terminus ad minimum sic differentia maximi et medii atque postremi. Patet hoc, quoniam differentia inter medium et minimum unitas est et medii ad maiorem binarius differentiam facit. Ergo dupla inter eos proportio reperitur, quam tenuit maximus idest senarius ad minimum idest ternarium. Proprietas autem huius medietatis contraria est arithmeticae medietati. In illa enim

SECONd CHAPTER

IN WHICH THE HARMONIC MEAN IS DISTINGUISHED

The harmonic mean is that which is constituted neither by the same differences nor by equal ratios; rather, just as the larger number holds itself [in relation] to the smallest, so the difference of the largest [number] and of the mean is compared against the difference of the mean and that of the smallest [number], as for example in these terms: 3:4:6.

For the number six exceeds the number four by its third part— that is, by two, but the number four [exceeds] the number three by its fourth [part]— that is, by one. Consequently, in these [numbers] neither the same ratio of the terms is found, nor the same differences discovered. However, just as the largest term is to the smallest, thus the difference of the largest [term] and of the mean is to the difference of the mean and [that] of the following [term]. This is clear, since the difference between the mean and the smallest [term] is one, and the number two represents the difference of the mean [with respect] to the
in minoribus terminis
maior erat proportio et in
maioribus minor, in hac
vero e contra, quoniam in
maioribus terminis maior
proportio et in minoribus
numeris minor habitudo
reperitur. Atque ideo
arithmetica medietas ei
rei publicae comparatur,
quae paucis regitur.
Idcirco quod in minoribus
eius terminis maior
proportio custoditur,
geometrica
proportionalitas popularis
quodam modo est; namque in
maioribus vel in minoribus
aequali omnium
proportionalitate
componitur et est inter
omnes paritas quaedam
medietatis, [aequum] ius
in proportionibus
conservatis. Musicam vero
medietate optimatum dicunt
esse rem publicam--rideo--
quod in maioribus terminis
maior proportionalitas
invenitur.

Quare istae
proportionalitates sic
appellatae sunt, alia
scilicet arithmetica, alia
geometrica, alia
harmonica, ratio est,
larger [term]. Therefore,
a duple ratio is found
between them, as the
largest--that is, the
number six--is held [in
relation] to the smallest
--that is, the number
three. However, the
property of this mean is
contrary to the arithmetic
mean. For in that [mean]
the ratio was greater in
the smaller terms and
smaller in the greater
terms, but in this [mean]
the opposite is true,
since the ratio is greater
in the greater terms and a
smaller relation is
found in the smaller
numbers. And therefore,
the arithmetic mean is
compared to that state
which is governed by the
few. On that account,
since a greater ratio is
kept in its smaller terms,
the geometric proportion
is in a certain way
"democratic," for it
is composed in greater or
smaller [terms] with an
equal proportion for all;
and there is a certain
equality of the mean among
all [of them]--that is, an
equal right in the ratios
that are preserved. But
[some] say that music is a
state with an aristocratic
mean--I laugh--because the
greater proportion is
found in the greater
terms.

Therefore, these
proportions are named in
the following manner:
that is, one [is called]
arithmetic, another [is
called] geometric, [and]
quoniam arithmetica dispositio aequas tantum per differentias dividit quantitates, geometrica vero terminos aequa proportione coniungit; sed harmonica ad alium re:artur, quia neque solum in terminis speculationem proportionis habet neque solum in differentiis, sed in utrasque communiter. Ipsarum enim musicarum consonantiarum, quas symphonias nominant, proportiones in hac paene sola medietate frequenter invenies. Ipsa enim symphonia diatessaron in epitrita proportione consistit ut est 4 ad 3, diapente consonantia in hemiolia proportione ut 6 ad 4. At ipsa omnium concordia diapason in dupla consistit ut 6 ad 3. In hac igitur medietate has tres simplices symphonias terminorum comparatione reperimus. Quod si ad differentias terminorum comparatio fiat, alias symphonias non simplices procreabimus, ut, si minimi ad differentiam inter minimum et medium fiat habitude, triplam custodiet proportionem, ex qua diapason et diapente consonantia redundabit. Sed si medi ad differentiam inter ipsum et minimum fecerimus relationem, quadruplum proportionem reperiemus, quae bisdiapason consonantia resonabit. Quod si idem numeri binario ducantur, ut efficientur 6. 8. 12,
eadem consonantiae
manebunt. Sed inter 8. 12
potest alius numerus
interseri, qui ad extrema
comparatus eas quas tenuit
toctonarius proportiones
conservabit, contrario
tamen modo, quia hic
scilicet novenarius ad
gravem partem diatessaron
et ad acutam servat
diapente, octo vero per
contrarium. Ad se invicem
vero sesquioctavam
custodiunt proportionem,
ex qua species qua
dicitur tonus redundat.
Haec enim species est
excessus diapente supra
diatessaron. Si autem 9
et 8 binario ducamus,
habeimus 18 et 16, quos
in sesquioctava
proportiones esse
cognoscimus. Inter quos,
ut ait Boetius, medius
numerus collocatur
scilicet 17, qui ad
maiorum comparatur
semitonium reddit minus,
ad minimum vero maius.
Maior enim proportio est
sesquidecimae sextae
sesquidecimae septimae
collatione. Quomodo autem
symphonias ex
proportionibus redundare
intelligamus, propter
novos cantores licet
rursus clarus discutere.

make a relation of the
mean to the difference
between the same and the
smallest, we will find a
quadruple ratio, which
will sound the consonance
of the bisdiapason. But
if the same numbers are
multiplied by two, so that
[the ratio] 6:8:12 is
produced, the consonances
will remain the same. But
another number can be
inserted between 8:12,
which compared to the
extremes will preserve
those ratios that the
number eight held.
Nevertheless, [this will
be done] in a contrary
manner, because this—that
is, the number nine—
preserves the diatessaron
in the low part and the
diapente in the high
part], but [the number]
eight does the opposite.
Truly, they preserve for
themselves the reciprocal
ratio of the sesquioctave,
from which proceeds the
species that is called a
tone. For this species is
the excess of the diapente
above the diatessaron.
However, if we multiply 9
and 8 by two, we will have
18 and 16, which we
acknowledge to be within
the sesquioctave ratio.
Between these [two
numbers]—as Boethius
says256—a mean number is
arranged—that is, 17—
which renders a minor
semitone [18:17 when] it
is compared to the larger
[number]; however, it
renders a major semitone
[17:16 when] it is
compared to the smallest

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
[number]. For the ratio of the sesquidecima sexta [17:16] is greater in comparison to the [ratio] of sesquidecima septima [18:17]. Moreover, for the sake of the inexperienced singers, permit us to discuss again more clearly how we perceive the symphonies to proceed from the ratios.
CAPITULUM TERTIUM

IN QUO PRIMARIAE MONOCHORDI DIVISIONES AD NUMERORUM RATIONES APPLICANTUR

In prima monochordi nostri regularis divisione Boetium numeris et mensura suum monochordum regulare subtiliter divisisse diximus. Nos vero propter novos per continuam quantitatem vulgaribus fractionibus nostrum divisimus, ne et arithmetica et geometria addiscemus prius cognovisse esset necessarium; nam esset incidere in errore, quem prohibuimus. Diximus enim nihil horum illi ad nostram doctrinam capescendam esse necessarium, modo primis rudimentis esset edoctus. Propter quod diximus, chordam medio esse dividendam aut quantitatem duplicandam, triplicandam aut per tria fore secandam, qui termini notissimi vulgaribus sunt. Nunc vero, quia de quantitate discreta, hoc est de numeris et numerorum proportionibus, aliqua, quae magis cantoribus esse necessaria cognoscebamus, determinavimus, easdem quas posuimus chordae vulgares divisiones ad rationem numerorum applicantes, in quibus

THIRD CHAPTER

IN WHICH THE PRIMARY DIVISIONS OF THE MONOCHORD ARE APPLIED TO THE NUMERICAL RATIOS

In the first division of our regular monochord we have said that Boethius accurately divided his regular monochord by numbers and measurement. However, for the sake of the inexperienced [singers], we have divided our [monochord] with common fractions by means of a continuous quantity, so that it would not be necessary for the student to have previously learned both arithmetic and geometry; for, without a doubt, he would fall into error, which we have prevented. Indeed, we have said that neither of these things is necessary in order for our doctrine to be understood—provided that [the student] has been thoroughly instructed in the beginning rudiments. For that reason we have said that a string should be divided in half, or the quantity should be doubled, tripled, or divided into three; these are terms that are very well-known to everyone. But now, since we have determined some aspects concerning the divided quantity—that is, concerning the numbers
proportionibus consistant, 
ostendemus hoc modo.

Est enim chorda in tota 
sui longitudine exempli 
gratia quatuor cum viginti 
digitorum, quae q a 
punctis terminatur. Cum 
igitur eam medio secamus 
littera h sectionem 
signantes, q h duodecim 
digitorum ad q a viginti 
quatuor in dupla 
collatione respondent. Si 
igitur chordam in tota sui 
longitudine percusseris et [77] 
sono perpenso digitum in 
puncto h [superponens] 
chordam h q impuleris, 
consonantiam diapason 
resonare deprehendes. Sic 
igitur diapason in dupla 
dicitur esse habitudine. 
Cum vero h a median 
dividimus quantitatem 
littera d in medio 
consignantes, chorda d q 
18 digitorum esse constat, 
quae ad totam comparata 
sesquitertiam servit 
proportionem. Inde ergo 
est, quod a d diatessaron 
est symphonia. At vero, 
cum quantitatem h q medio 
secamus litteram p in 
sectionis medio 
configentes, constat p q 
sex tantum esse digitorum, 
qui numerus quater ductus 
24 implet. Ergo quadrupla 
erit habitudo necessario. 
Inde ergo est, quod p

and the numerical ratios-- 
which we know to be more 
necessary for the singers 
--by applying the same 
common divisions of the 
string which we have 
established in the theory 
of the numbers, we will 
thus show what ratios 
[these divisions] 
consist of.

For example, there is a 
string in its entire 
length of twenty-four 
 inches that is limited 
by the points q-a. 
Consequently, when we 
divide it in half, marking 
the section with the 
letter h, [the segment] 
q-h of twelve inches 
corresponds to the twenty-
four of q-a in a duple 
comparison. Now you will 
perceive the consonance of 
the diapason to resound if 
you will strike the string 
in its entire length, and 
after the sound has been 
carefully considered, you 
will strike the string h-q 
[by] placing your finger 
on the point h. Therefore, 
by this method the 
diapason is said to be in 
a duple relationship 
[2:1]. But when we divide 
the quantity h-a in half, 
marking the letter d in 
the middle, the string d-q 
consists of 18 inches, 
which, compared to the 
whole, is governed by the 
sesquitertian ratio [4:3]. 
Whence, it is [done] 
accordingly, because a-d 
is the symphony of the 
diatessaron. But truly, 
when we divide the 
quantity h-q in half,
littera ad a bisdiapason resonat melodiam cumque h p medio divisa littera l sectio signatur, 9 esse l q digitorum quantitatem recte conspicimus. Quam si ad totam comparemus, duplam superbipartientem diapason et diatessaron consonantiam conservantem, quam ut ait Boetius, solus Ptolemaeus inter consonantias admittit. Sed de his, quia et in compositione trium quatuorque vocum experientia aliqua monstrabimus et ratione paulo post in speculatione permulta dicturi sumus, hic supersedemus.

Cum igitur totam chordam per tria dividentes et a littera q versus a venientes in trient litteram ponimus m et in besse e, m q 8 esse digitorum clare monstrabimus, quae ter ducta 24 integre metitur et sic triplam servans proportionem diapente et diapason ad totam chordam marking the letter p in the middle of the section, p-q consists of only six inches, a number which multiplied by four equals 24. Therefore, it is inevitable that the relationship will be quadruple [4:1]. Whence, it is [done] accordingly, because the letter p to the [letter] a produces the melody of the bisdiapason, and when h-p is divided in half, the section is marked by the letter l [and] we correctly perceive that the quantity l-q is of 9 inches. But if we compare [it] to the whole, we will find a duple superbipartient ratio [8:3], preserving the consonance of the diapason plus the diatessaron, which, as Boethius says, only Ptolemy admits among the consonances. But we pass over these matters here because we are going to show some proofs in the composition of three and four voices, and a little later we are going to discuss many things in a theoretical speculation.

Therefore, dividing the entire string into three [parts], and advancing from the letter q toward [the letter] a, when we place the letter m at the one-third [part] and [the letter] e at the two-thirds [part], we will clearly show m-q to be of 8 inches, which [when] multiplied by three
resonat symphoniam. Sed e q 16, qui sesqualter totius reperitur ac per hoc diapente resonat cum a [q]. Verum in h d quantitatem medio secamus littera f sectionem configurantes. Quoniam [q d] vero 18 digitos habere monstratum est, [q] f quindecim esse digitorum indubitanter cognoscimus, quos si ad [q] d referamus, sesquiquintam habitudinem comprehendimus. Excedit enim 18. 15 ternario, qui quinta pars minoris est. Verum si ad [q] h comparetur, in sesquiquarta collatione esse deprehendimus. Et ex ista comparatione ditonus sive bitonus consonantia fit, ex illa vero semiditonus sive trihemitonius species generatur, quam ex tono perfecto et imperfecto constare manifestum est. Quod si eiusdem [q] f ad [q] a fiat comparatio, supertripartientis quintas reperitur habitudo. Excedit enim 24 numerus numerum quindecennarium in tres quintas minimi partes. Ex hac enim collatione diapente cum semitonio sive sexta minor aut hexas minor consonantia resonabit. Quod si eiusdem [q] f ad [q] 1 fecerimus relationem, superbipartientem inter eas repperimus proportionem. Superatur enim novenarius a quindennario numero senario, qui ex duabus correctly measures 24 inches; and thus [by] observing the triple ratio [3:1], the symphony of the diapente plus the diapason resounds [in relation] to the entire string. But e-q is 16 [inches], which is found to be the sesquialter of the whole [3:2], and by this means the diapente resounds with a-[q]. But now let us divide the quantity h-d in half, marking the section with the letter f. But since q-d was shown to have 18 inches, certainly we recognize [q]-f to be of 15 inches, which we perceive to be the sesquiquintan relationship [6:5] if we relate it to [q]-d. For 18 exceeds 15 by three, which is a fifth part of the smaller [term]. But if it is compared to q-h, we perceive [it] to be in the sesquiquartan relationship [5:4]. And the consonance of the ditone or, if you prefer, the bitone is made from this comparison, and from that the semiditone or, if you prefer, the trihemitone species is produced, which, it is clear, consists of a perfect and an imperfect tone. But if a comparison is made of the same [q]-f to [q]-a, a relationship of the supertripartient fifths is found [8:5]. For the number 24 exceeds the number 15 by three-fifths parts of the smallest [term]. Certainly, the consonance
Sic igitur omnes nostras, quia vulgares et non difficiles sunt fractiones, facillimas fecimus divisiones. Guido vero per novem passus monochordum docet dividere suum, quod laboriosum et taediosum esse intuentibus liquido patet hoc ideo, quia, ut diximus, tonus in sesquioctava consistit proportione. Difficilius enim est alicuibus integri octavam quam medietatem aut tertiam sumere partem. Et per nostram divisionem sicut et per suam tonus efficaciter reperitur ut de quam 18 et 16 numeri impleunt aut 1 m, quae 9 et 8 numerorum ambitu conscribitur. Therefore, in this manner we have made all our divisions very easily, because the fractions are common and not difficult. But Guido teaches to divide his monochord by means of nine steps, which clearly appears to be laborious and tedious to anyone contemplating this, because, as we have said, the tone exists in the sesquioctave ratio [9:8]. For it is more difficult to take the eighth part of some whole than to take a half or a third part. And the tone is effectively found by means of our division, just as it is by means of his, for example: [the interval] d-e which the numbers 18 and 16 fulfill, or 1-m, which is expressed within the ambitus of the numbers 9 and 8.
Sed de his hactenus. Nunc autem quae semitonia monochordi canenda sint, quae vero evitanda videantur, quoniam unum maius, aliud minus reperitur, discutiamus.

But enough concerning these things. And now, let us discuss which semitones of the monochord should be sung, and which [ones], it seems, must be avoided, since it is ascertained that one is major [and] the other is minor.264
CAPITULUM [QUARTUM]
IN QUO SEMITONIA CANENDA AUT EVITANDA

Quoniam dictum est [tonum] in duo aequa non dividi semitonia et omnia tonorum spatia instrumenti perfecti in duo semitonia monstravimus esse divisa, dicendum restat, quod illorum sit canendum et quod evitandum, sic et de aliis speciebus, quae per semitonia variantur. Et ita huius priami voluminis complementum practicis principaliter deputatum ordinate perficiemus.

In arte igitur prima imperfecta, in prima scilicet monochordi divisione unum tantum est semitonium, quod evitari debet, illud scilicet quod apotome a Platone dictum fuisse constat. Igitur cantores aut instrumentorum pulsatores numquam faciant transitum a voce sive chorda $b$ in $b\flat$ nec e contra, quoniam illud semitonium in symphonia non ponitur, cum neque in diatessaron neque in diapente neque in

FOURTH CHAPTER
IN WHICH [IT IS EXAMINED] WHICH SEMITONES SHOULD BE SUNG AND WHICH SEMITONES SHOULD BE AVOIDED

Since it has been said [by others] that the tone is not [to be] divided into two equal semitones, and [since] we have shown that all the spaces of the tones of a perfect instrument are divided into two [unequal] semitones, there remains to be discussed which of them should be sung and which should be avoided. Likewise [we will discuss] the other species that differ by means of a semitone. And thus in an orderly manner we will bring to an end that which completes this first volume, considered principally for the practicing musicians.

Therefore, in [our] first incomplete theory—that is, in the first division of the monochord—there is only one semitone that should be avoided—namely, that which is known to have been called apotome by Plato. Therefore, the singers or players of instruments never make a transition from the note or string $b\flat$ to $b$, nor vice-versa, because that semitone is not established as a symphony.
diapason aut in aliis
imperfectis speciebus aut
discordantibus simul et
concordantibus successice
convenire umquam visum
sit. In monochordo vero
perfecto multa loca sunt,
in quibus transitus in
cantu evitandus est. Per/modum igitur doctrinae ea
practicis assignabimus.

Theoricis vero in sequenti
volumine rationibus
firmissimis veritatem
demonstrabimus.

For it has never been seen
to come about in the
diatessaron, nor in the
diapente, nor in the
diapason, nor in the other
imperfect species, nor in
discords [that are played] at
the same time,\textsuperscript{267} nor
in concords [that are
played] successively.\textsuperscript{268}
But there are many places
on the complete monochord
where a transition [from
one step to another]
should be avoided within
the song. Therefore, by
means of [our] teaching,
we will impress these
things upon the practicing
musicians. But we will
demonstrate the truth to
the theorists in the
following volume with the
firmest reasoning.

Ad mensuratam igitur
figuram, quae in prima
parte tractatu secundo
capitulo quinto posita
fuit, redeamus. Est enim [79]
prima vox sive corda a,
secunda vero prima $b$ idest
prima $b$ mollis coniuncta.
Hic enim transitus bonus
est, quoniam per
semitonium, quod
symphonii adaptatur,
distare visae sunt. Sed a
prima $b$ in $f$ transitus non
fit, quoniam illud
semitonium non cantatur,
quod apotome vocatum est.
A qua $b$ in c bonum
semitonium est, sed a c in
prima $f$ malum; ab ista in
d bonum, a qua in secunda
$b$ similiter bonum; a qua
in e malum, sed ab e in $f$
bonum. Ab $f$ vero in
secunda $f$ malum, sed ab
ista in g bonum, a qua in

Now let us return to the
measured figure which was
established in the first
part, the second treatise,
the fifth chapter. For
the first note or string
is $a$, but the second
[note] is the first $b$
[$bb$]--that is, the first
conjunct soft $b$. For this
transition is good, since
that which is adapted to
the symphonies are seen to
be distant by a semitone.
But a transition is not
made from the first $b$ [$bb$]
to $f$ [bf], since that
semitone which is called
apotome is not sung.
There is a good semitone
from this $b$ [$bb$] to $c$, but
from $c$ to the first $f$ [$cf$]
is bad; from this $c$ to the
$d$ is good, [and] similarly
from this $d$ to the
second $b$ [$eb$] is good;
tertia \( b \) similiter bonum. 
A tertia \( b \) in \( h \) malum, ab \( h \) in \( i \) sive in \( b \) bonum, ab \( b \) in \( f \) malum et deinceps. 
Ad hunc modum in suis octavis mala malis, bona vero bonis correspondent.

Transitus autem tonorum bonorum atque malorum, qui non ad sequentem sed una [scilicet voce] semper in hoc instrumento medio dimissa fit, sic declaratur: Ab \( a \) in \( b \) tonus bonus est, quia ex semitonio maiori atque minori componitur, et a prima \( b \) mollis conjuncta in \( c \) similiter. Eodem modo a littera \( b \) in prima \( f \), a qua ad secundam \( b \) malus. Eodem modo a secunda \( f \) ad tertiam \( b \) et in suis octavis similiter. Ceteri vero transitus tonorum una intermissa semper singuli sunt boni. Trihemitonia vero duabus intermissis ubique sunt bona, nisi cum ordo accidentalis alteri accidentalis miscetur, ut a prima \( b \) in prima \( f \) et a secunda \( b \) ad secundam \( f \).

However, the transition of the good and of the bad tones\(^{269}\)--which is made not on the following [note], but rather with one [note] always dismissed in the middle on this instrument --is explained in this way: There is a good tone from \( a \) to \( b[f] \), because it is composed of a major and a minor semitone; and similarly from the first conjunct soft \( b[bb] \) to \( c \). In the same way [the tone is good] from the letter \( b[bb] \) to the first \( f[c#] \), but [the tone] is bad from this \( c# \) to the second \( b[eb] \). In the same way [the tone] from the second \( f[f#] \) to the third \( b[ab] \) [is bad], and similarly at their octaves.\(^{270}\) But the remaining transitions of the tones [consisting

---

\(^{269}\) Reprinted with permission of the copyright owner. Further reproduction prohibited without permission.
Ideoque tertia $b$ non est bona cum $f$. Ditonus vero, qui quatuor fit intermissis, ubique est bonus, nisi a littera $b$ in secundam $b$ et a prima $f$ in $f$ nec ab $e$ in tertiam $b$ nec a secunda $f$ in $b$ vel in $i$ et ita in istorum octavis. Diatessaron vero, quae ad sextam in hoc instrumento fit semper vocem, ubique est bona nisi a tertia $b$ in tertiam $f$ et in suis octavis. Diapente vero, quae fit ad octavam, ubique est bona praeter quam a prima $f$ quadro in tertiam $b$, quoniam ad quartam $b$ est diapente perfecta. De sexta vero minori, quae ad nonam semper fit chordam, sicut de tertia minori sentimus. Chorda enim, quae trihemitonio cassa fuit, hexade carebit minori. Sic sexta maior et tertia maior; nam chorda, quae ditono caruit, hexade maioris privatur. Sic et septima maior aut minor sicut tonus et semitonium; namque sicut istae ad fontem sic heptas maior aut minor ad eius octavam se habent.

of] only one interval, taken separately, are always good. But the trihemitones [consisting of] two intervals are good anywhere except when the accidental order is mixed with another accidental order, for example: from the first $b$ [$bb$] to the first $f$ [$c#$], and from the second $b$ [$eb$] to the second $f$ [$f#$]. In like manner the third $b$ [$ab$] is not good with $f$ [$bb$]. But the ditone, which is made with four intervals, is good anywhere except from the letter $b$ [$bb$] to the second $b$ [$eb$], and from the first $f$ [$c#$] to $f$, and [also] from $e$ to the third $b$ [$ab$], and from the second $f$ [$f#$] to $b$ [$bb$] or $i$; and likewise at their octaves. But the diatessaron (which on this instrument is always made up to the sixth note), is good anywhere except from the third $b$ [$ab$] to the third $f$ [$c#$], and at its octaves. But the diapente, which is made on the eighth [string], is good anywhere except from the first square $f$ [$c#$] to the third $b$ [$ab$], since there is a perfect diapente [from $ab$] to the fourth $b$ [$eb$]. But in regard to the minor sixth, which is always made on the ninth string, we reason just as [we did] about the minor third. For the string that was lacking the trihemitone will [also] lack the minor hexad; likewise [also] the major sixth and the major
For these strings or, if you prefer, these courses on which the strings are struck, are commonly called taedæ, [and] are arranged by our contemporaries on the monochord in such a way that the courses of the natural order may proceed in a correct manner with the synēmmenōn omitted, as we show in the first measured figure. But indeed, the fingerboards of the synēmmenōn and of the accidental orders are arranged somewhat elevated above these, [and] they are depicted with a different color, as it appears in the figure. But that string [which is] arranged between h and g should be noted and given a great deal of attention. For some of the practicing musicians with less foresight arrange it in such a way that it is a good semitone with h, but a bad [semitone] with g. And thus they make that [note] resound a diapente with the first square ♭ [c♯], which is a useless diapente, since it is rarely made and, to tell

Has etenim chordas sive tractus, quibus chordae percutiuntur, qui vulgariter [taedae] sunt nuncupati, in monochordo sic disponunt contemporanei nostri, ut tractus ordinis naturalis recto modo [procedant] abiecto synēmmenōn, ut in prima mensurata ostendimus figura. At vero [taedae] synēmmenōn et ordinum accidentalium aliquantulum super his elevatae ponuntur diverso depinctae colore, ut patet in figura. Sed notandum est et valde notandum de illa chorda inter h et g collocata. Quidam enim practicorum minus bene praevidentes ita illam disponunt, ut cum h sit bonum semitonium, cum g vero malum. Et sic diapente cum prima ♭ quadro illam faciunt resonare, quae diapente inutilis est, quoniam rare fit et, ut verius loquar, numquam fieri debet.

Verum si quis dicat: ad hoc ponitur, ut, cum tenor descendit ad a per b, discantus habeat sextam maiorem in illa tendens ad diapason h, respondemus,
quod nunc in tenore debet fieri variatio, hoc est descendere per primam \( b \) mollis coniunctam, quae sexta maior est ad \( g \). Et sic fiet transitus non solum ita bonus, verum melior, dulcior atque suavior; et si media vox interponatur, habet tertiam maiorem in \( d \), a qua veniet in quintam scilicet \( e \) regulam supra positam servans, quam non habet, si alio modo descendat. Nuncque secunda \( b \) non coniungitur huic ratione signata.

Et si quis vellet dicere, quod ibi renascitur protus et condiciones, quas habuit \( d \), debet \( d \) et \( h \) obtinere et \( d \) semitonium sub se et supra se habere monstratum sit, eodem modo et \( h \), respondebimus dicentes argumentum non procedere, quoniam illud habuit \( g \), quae totalem similitudinem sub et supra in synemmenon tetrachordo vendicat sibi, non tamen \( h \), quia sub se duos tonos habet. Licet

Et si quis vellet dicere, quod ibi renascitur protus et condiciones, quas habuit \( d \), debet \( d \) et \( h \) obtinere et \( d \) semitonium sub se et supra se habere monstratum sit, eodem modo et \( h \), respondebimus dicentes argumentum non procedere, quoniam illud habuit \( g \), quae totalem similitudinem sub et supra in synemmenon tetrachordo vendicat sibi, non tamen \( h \), quia sub se duos tonos habet. Licet the truth, should never be made. Truly, if anyone should say: "It is placed there whenever the tenor descends to \( a \) from \( b \) in order that the discant may hold a major sixth at that [place] extending to the diapason \( h\)"—we respond that a variation should be made in the tenor now—that is, it [should] descend by means of the first conjunct soft \( b \) \([bb]\), which is a major sixth with \( g \). And not only will a good transition be made under these circumstances, but [it will be] better, sweeter, and smoother; and if a middle note is inserted, it holds a major third on \( d \). From here, observing the rule presented above, it will advance to the fifth—that is, \( e \)—which it does not hold to if [the tenor] descends in another manner. For the second \( b \) \([eb]\) is not joined to this for the reason [that has been] indicated.

And if anyone wishes to say that there [on \( h \)] the protus is born again, and the conditions which \( d \) held to should also be obtained on \( h \), and [that] since \( d \) was shown to have a semitone below and above itself, \( h \) also [ought to proceed] in the same way, we will respond by saying that the argument does not proceed [logically], since the former held \( g \), which claims all similitude to itself below and above in
prima diapente sit in disiuncto intensa, sic et diatessaron, verum tamen diatessaron supra diapente primam non habet sed secundam. Igitur illa chorda in coniuncto deuterus est tam autenticus quam plagalis.

Alii vero practici dicunt: si hoc fieret, diapente e \( \text{t} \) quadro non haberet tertiam mediam, quae maior ad inferiorem et minor sit ad superiorem, ut in parte diximus secunda tractatu tertio compositionis. Sed hoc non obstat, quia, cum illa phrygii sit incitativa, non refert, si tertia careat media vel si maior ad superiorem et minor ponatur ad inferiorem.

But other practicing musicians say: "If this [tuning of the note between \( g \) and \( h \)] were to be made, the diapente e-square \( \text{i} \) would not have an intermediate third \( [g\#] \)," which is a major [third] in relation to the lower [note] and a minor [third] in relation to the upper [note], as we have said in the second part, the third treatise [in the chapter] concerning composition. But this is not an obstacle, because when that [harmony] of the Phrygian is aroused, it does not matter if it lacks the intermediate third, or if the major [third] is established in relation to the upper [note] and the minor [third] is established in relation to the lower [note].

Nevertheless, [this is not true] with \( h \), because it contains two tones below itself. Even though the first diapente may ascend toward the disjunct [tetrachord], and likewise the [first] diatessaron; nevertheless, it does not hold the [first] diatessaron \( [a-d] \) above the first diapente \( [d-h] \) but the second [diatessaron instead]. Therefore, that string \( [h] \) is the deuterus in the conjunct [tetrachord, and it is] as much authentic as it is plagal.
Quidam vero volentes utrique satisfacere parti aliam chordam inter tertiam b et h interserunt, quam a tertia b per commatis spatium distare faciunt. Hoc tamen non laudatur propter hoc, quia esset tunc alius genus mixtum et non diatonicum simplex. Tristanus [vero] de Silva, amicus noster, inter f et secundam f aliam chordam dicebat esse interponendam. Sic et per numeros se repperisse testabatur. Credimus enim error illi sic emerserit, ut gama, vox quae addita fuit a nostris, fore creditit proslambanomenon. Neque hoc neque illud in diatonico genere nostro admitendum esse arbitramur. Nam tunc in illum incideremus errorem, in quem Timotheum Milesium teste Boetio incidisset legimus genus scilicet diatonicum in chromaticum, quod melius est, convertentem, propter quod illum Lacedaemonii de [Laconica] exegerit civitate, quoniam puerorum animos, quos acceperat erudiendos, [officiebat] et a virtutis modestia ad [mollitiem] declinantes effeminatos efficiebat. Non igitur tantum utilitatem illa tertia media nobis adducit, quantum discrepantiam atque discordiam in toto ordine provenit, cum neque secundum naturalem neque secundum aliquem accidentalem ordinem illo modo, ut isti dicunt, but some [people], wishing to satisfy both parts, insert another string between the third b [ab] and h, which they make distant from the third b [ab] by the space of a comma. Nevertheless, this is not praised on account of this: because then it would be another mixed genus rather than the simple diatonic [genus]. But our friend Tristan de Silva used to say that another string should be inserted between f and the second f [ff#. And thus he claimed to have discovered it by means of the numbers themselves. Indeed, we believe that the error will appear to him just as [the error] that gamma—a note which was added by our [predecessors]—would someday be treated as proslambanomenos. Therefore, we do not believe that the latter [the string between F and F#] nor the former [the string between Ab and A] should be admitted in our diatonic genus. For then we would fall into that error which we have read Timotheus of Miletus fell into—according to the testimony of Boethius—namely, that he converted the diatonic genus into the chromatic (which is better). [And] on account of this, the Lacedaemonians of Laconia cast him out of the city, since he was harming the souls of the young boys which he had accepted for...

the purpose of teaching; and by deviating from the moderation of virtue toward softness, he was producing effeminate [young men]. Therefore, that intermediate third does not bring usefulness to us as much as it advances discrepancy and discord in the entire order, since, as the masters say, by this means it may not be arranged according to the natural [order] nor according to another accidental order. But enough concerning these things. Nevertheless, they will better perceive [the concepts] of the first [volume], whose truth we will explain in the following volume with the firmest numerical calculations. But now, let us put an end to this work by continuing [with] the epilogue mentioned above.
Aufer igitur, iucundissime lector, ex animo tuo segnes pristinae ignorantiae nebulas et opusculi nostri huius claro irradiante fulgore piceam ab oculis tuis expelle caliginem; intuere et dispece omnem hanc musicae nostrae supellectilem, circumfer lumina, cuncta perlustra, locos omnes rimare. Quo perspicatius animum intenderis, eo magis nobiscum senties. Et ubi ad huius pulcherrimae veritatis, quam in communem utilitatem adducere curavimus, ducente deo perveneris agnitionem, gratias deo ages, mei memoriam servabis, opusculo isti et labori meo favebis. Sic enim facias necesse est, si turpissimum voles crimem ingratitudinis evadere. Si quid tamen a ratione dissonum et veritati non consentaneum reperreris, correctioni locum relinquo, in me examen admitto. Sed unum oro, ut, priusquam improbes, intelligas nec ad iudicandum praeceps eas. Pugnam non timeo, si praesente et iudicante ratione pugnabitur. Animadverte, oro, quanto cum sudore quorundam musicorum cantorumque levissimas opiniones refellendo, quorundam vero, quibus magis favebat

Therefore dearest reader, remove the lingering clouds of former ignorance from your mind and expel the pitch-pine darkness from your eyes with the clear irradiant splendor of this our little work; open your eyes wide and contemplate all these devices of our music; move around [in] the light, examine everything completely, investigate all the topics thoroughly. The more acutely you stretch [your] mind, the more you will perceive with us. And when, with God directing [your course], you have arrived at the recognition of this most beautiful truth which we have provided for the common good, you will give thanks to God, you will remember me, [and] you will delight in this little work and in my labor. For thus it is necessary that you do [this] if you want to avoid the most shameful transgression of ingratitude. Nevertheless, if you find anything that disagrees with reason and does not agree with the truth, I leave a place for correction [and] I subject myself to examination. But one thing I ask: before you reject [anything], you understand [it] and not
veritas, approbando et quae indigeste et tumultuarie tradita videbantur ab aliis ad perpendiculum dirigendo libellum istum [composuerimus]. In quo si eum, qui in Boetio est, eloquentiae florem non videris, veniam dabis. Ego enim semper veritatis quam facundiae studiosior fui, et nobis ut plurimum in hoc opusculo sermo est ad cantores, qui maiori ex parte imperiti rudesque comprobantur, et non numquam eorum inconcinna dicta et barbaris contexta vocabulis necesse fuit, ut improbarentur, operi interserere.

proceed to a hasty judgment. I do not fear a quarrel if it is fought with reason presiding and judging. Notice, I beg of you, with what great toil we have composed this little book, refuting the insignificant opinions of some musicians and singers, approving [the opinions] of certain ones whom truth favored more, and directing [you] to a plumb-line away from others who seem to have been taught hastily and in a disorderly manner. If you do not see in this [work] that blossom of eloquence which is [found] in Boethius, you will forgive me. For I have always given more attention to the truth than to eloquence of language, since the discourse in this little work of ours is, for the most part, for the singers, most of whom are acknowledged to be ignorant and untrained; and in order that [the mistaken ideas of certain musicians] may be rejected, sometimes it has been necessary to insert in the work their awkward expressions that are interwoven with barbarous words.

Therefore, so that I may conclude with a brief summary of all the things which have been said, first--by discussing the sounds extended successively and in a series all the way through
musicam transeuntes miras
et diversas esse
ostendimus et per alia duo
melorum genera subtiliter
et non ab re antiquis
pervigilata transcurrentes
ad ipsas antiquorum
neotericorumque symphonias
diffiniendas accessimus.
Deinde per numerorum
passiones ingressi et
frivolas cantorum
opiniones iuxta
proportiones evitantes ad
proportionalitates, quibus
symphoniae tamquam
fundamentis innituntur,
accessimus et monochordum
nostrum recte per numeros
esse divisum subtiliter
insinuavimus.

Sed qui veram et
perfacilem huius
disciplinae viam sine
argumentorum obscuritate,
sine probationum
improbationumque longis
ambagibus percipere
desiderat, libellum
nostrum musices, quem
Introductorium seu
Isagogicon appellavimus,
inquirat. Illic abunde,
breviter et dilucide rei
summan invenies. Et cum
ea, quae illic videbis,
firmare rationibus et
altius intueri voles, ad
opus hoc reverteris, quod
est quasi arx illius ac
propugnaculum. Ex isto ad
declaramus defendendumque
illud opportuna deligere
potes instrumenta ab aliis

the entire concentus—we have shown the qualities
of their modes to be
wonderful and diverse;
passing over musica
mundana and musica humana,
and subtly passing through
the other two genera of
melody, [and] not avoiding
the vigils of ancient
truth, we progressed to
defining those symphonies
of the ancients and of the
modern theorists. Then,
entering into the
phenomenon of the numbers
and avoiding the frivolous
opinions of the singers,
we progressed to the
proportions along with the
ratios, which the
fundamental symphonies
rest upon; and in great
detail we introduced our
monochord that is
correctly divided by means
of the proportions.

But whoever desires to
take the true and easy
path of this discipline
without the obscurity of
arguments [and] without
the long digressions of
demonstrations and
disapprobations, let him
seek our little music book
which we have entitled
Introductorium or
Isagogicon. There you
will find in abundance the
most vital issues of
theory [stated] briefly
and clearly. And when you
wish to fortify those
things which you will see
there with reasons and
consider them in more
depth, you will return to
this work which [acts] as
a refuge and a bulwark for
igitur excogitata et quaedam per me nuper inventa scrutare diligenter. Non parum enim in his legendis utilitatis voluptatisque percepturus es et immortali deo bonorum omnium largitori, qui omnes liberales artes ad hominum perfectionem delectationemque condidit, ut praedixi, gratias ages, cui est gloria per infinita seculorum secula, amen. Explicit musica practica Bartolomei Rami de Pareia Hispani ex Betica provincia et civitate Baecza Gienna dioecesi vel suffragana oriundi, almae urbis Bononieae, dum eam ibidem publice legeret, impressa anno Domini millesimo [quadringentesimo] [octogesimo] secundo quarto idus Maii.

(Explicit feliciter prima pars musicae egregii et famosi musici Bartholomei Parea Hispani, cum publice muscam Bononiae legeret, in qua tota practica cantorum pertractatur, impressa vero operae et industria ac expensis magistri Baltasaris de Hiriiberia that [other work]. From this [book] you can choose suitable material for the purpose of explaining and defending that which has been contrived by others, and then you can diligently investigate some things recently discovered by me. For you are not going to receive too little of usefulness and pleasure in these readings, and as I said before, you will give thanks to the immortal God, provider of all good things, who established all the liberal arts for the perfection and delight of men; to Him is the glory throughout the endless ages of ages. Amen. Thus ends the Musica practica of Bartolomeo Ramos de Pareia of Spain [who was] born in the city of Baeza, in the province of Baetica, in the district or, if you prefer, the jurisdiction of Gienna. [For] it was published in the nourishing town of Bologna while he lectured publicly there, on the eleventh day of May in the year of our Lord, 1482.

(Thus ends the first part of the music of the distinguished and famous musician—the Spaniard Bartolomeo Pareia, in which the entire practice of the singers is treated. And it was published while he lectured publicly on music in Bologna by means of the labor, diligence,
anno domini 1482 die 5o Junii.)

and expense of Maestro Baltasar de Hiriberia, on the fifth day of June in the year of our Lord 1482.) 279

REGISTRUM

Primum vacat, boetii musices (1); finito (3); Manus (11); Rogerio (13); gravitatem (15); et quando (23); est ipse (25); mutationes (27); habent (29); quantitatem (39); paranete (41); figura (47); secunda pars (49); volumine (51); tenore (53); 3a pars (61); est semibrevis (63); ponatur (65); Capitulum (73); maximus (75); repperisse (81).
ENDNOTES

1. Although Ramos himself assumes the authority of auctoritas, he calls upon Boethius to establish his credibility. The Musica practica is, to a large extent, an abridged and practical treatment of the theoretical concepts presented by Boethius in the De institutione musica (sixth century).

2. Father and son figures of Greek mythology, who invented wings of wax to flee from their imprisonment of a labyrinth in Crete. Daedalus flew successfully to Sicily, where he was welcomed by King Cocalus; but Icarus, his son, was drowned in the Aegean Sea when his wings melted from flying too close to the sun.

3. Marcus Tullius Cicero (106-43 B.C.), considered to be Rome's greatest orator and writer. His eloquent style has become the standard by which other Latin prose is judged.

4. Caius Sallustius Crispus (86-34 B.C.), a Roman historian known for his persuasive rhetorical style, demonstrated in his most famous work, Bellum Catilinarium.

5. Ramos mentions a host of both mythological and historical figures: Orpheus (the mythic singer, who attempted to bring back Eurydice from the Lower World, but lost her after he broke his promise and turned to look at her); Amphion (whose magical ability upon the lyre moved stones and built the walls of Thebes); Arion (a celebrated kitharist from Lesbos who, after being thrown overboard by sailors, was rescued from drowning by dolphins); Mercury (messenger of the gods and conductor of departed souls to the Lower World); Linus (son of Apollo and Terpsichore and teacher of both Orpheus and Hercules; the latter killed Linus with a blow from his lyre after being reproached during his music lesson); Solomon (king of Israel, second son of King David; Proverbs, Song of Solomon, and Ecclesiastes of the Old Testament have been ascribed to him); Pythagorus (the celebrated philosopher of Samos, ca. 550 BC, who discovered the mathematical basis of musical consonance in a blacksmith's shop); Aristoxenus (philosopher, musician, and pupil of Aristotle, who marked a turning point in Greek theory by basing musical theory upon the analysis of musical practice); Ptolemy (astronomer and philosopher, ca. AD 100-70, who integrated the concepts of Pythagorus and Aristoxenus in his Harmonica); Chorebus
(Coroebus? Grandfather of Linus who slew the monster Poene to protect the children of Argos from being devoured); Lycaon (king of Arcadia, whom Jupiter turned into a wolf when he found that Lycaon had defiled the altar with human sacrifices); Prophrastus (Prophrastus of Pieria, often referred to as Theophrastus, who is credited with adding the ninth string to the lyre); and Timotheus (musician of Miletus who was expelled from Laconica for adding a string to the lyre that made music more capricious and steered the minds of his young pupils away from the moderation of virtue).


7. Priscianus Caesariensis, a celebrated grammarians during the time of the emperor Justinian (ca. 500 A.D.); his Institutiones grammaticae became the standard text for teaching grammar in the medieval schools.

8. Terni notes that Ramos makes a distinction between "harmony" and "music." This definition of harmony suggests a vertical concept, as opposed to the horizontal thinking of earlier contrapuntists.

9. Ramos usually differentiates between the terms vox and sonus. Bower notes that the term vox can have a variety of meanings, even in a musical context—pitch, note, the human voice (either speaking or singing), or sound in general. Ramos uses the term sonus to refer to sound as a musical entity. The definition generally becomes clear within the context of the sentence.


11. Terni notes the tautology of Ramos's definitions of vox and sonus to that found in Tinctoris's Terminorum musicae diffinitorium: "Vox est sonus naturaliter aut artificialiter prolatus" while "Sonus est quicquid proprie et per se ab auditu percipitur." Translation: "The voice is a sound produced naturally or artificially" while "sound is whatever is perceived exclusively and intrinsically by the sense of hearing." See Johannes de Tinctoris, Terminorum musicae diffinitorium, facsimile of the Treviso Edition (ca. 1494), vol. XXVI, Monuments of Music and Music Literature in Facsimile (New York: Broude Brothers Limited, 1966), s.v.

12. lit., "plainsong."
13. lit., "counterpoint."

14. lit., "figured song."

15. lit., "the song of the instrument."

16. i.e., the monochord.

17. Bower notes that the Latin verbs *intentio* and *remissio* have a duplicity of meaning. *Intentio* can imply an increase in the tension of a string (stretching), thereby resulting in a higher pitch—an elevation of the sound, whereas *remissio* implies the opposite, that is—a loosening of the tension (relaxing), thereby resulting in a lower pitch. Thus, at times these two verbs will be translated, respectively, as "to tighten" or "to loosen," and at times as "to raise" or "to lower."

18. The third declension adjective *regularis* can be defined as "regular," "well-ordered," or "that which contains rules." I have elected to translate this adjective as "regular" to remind the reader of its derivation from the noun meaning "a rule" or "ruler" (*regula* in Latin; *χωδων* in Greek). Musicians used the "monochord rule" to audibly demonstrate the principles of their musical propositions. For further discussion of the monochord, see Cecil Adkins, "The Theory and Practice of the Monochord" (Ph.D. diss., State University of Iowa, 1963).

19. The natural sign (ι) is used in this translation to represent square b. Ramos is inconsistent in the usage of square b, preceding square b with the modifier *quadrum* or *quadratum*, noting square b sign without the modifier, and even writing *b mi* with a round-shaped b. Ramos uses the letter b as well as the sign round b to signify the note bb. To avoid confusion, I have used the sign b to represent b *rotundum* and the sign ι to represent b *quadrum* or *quadratum*.

20. Terni suggests that this statement is evidence that Ramos, in his practical point of view, does not consider the major/minor semitone controversy to be a problem. Without qualification, Ramos labels both i-ι (bb-bι) and ι-κ (bι-c) as "semitones."

21. h=a, i=bι, ι=bι, k=c, l=d, m=e, n=f, o=g, p=a.

22. Gaffurius's marginal annotation: "Si tonus non est in duo aequalia divisibilis, non datur commedietas quae ex ditono sublata ipsum in semiditonum redigat." Translation: "If the tone is not divisible into two equal
parts, the *commedietas* is not given, which taken from the
ditone reduces it to the semiditone."

23. Boethius, *De institutione musica*, Book IV,
Chapter 5. See Anicius Manlius Severinus Boethius, *De
institutione musica*, ed. by Godofredus Friedlein (Lipsiae:
Teubneri, 1867), 312-18.

24. lit., "conjunct."

25. lit., "disjunct."

26. Ramos notes that the *hyperbolaión* is the
"highest" tetrachord, but it is also possible that he is
referring to its designation as *excellentès* in the *Musica
enchiriadis*, since he cites this treatise later on in this
chapter. In the *Musica enchiriadis*, the gamut is divided
into four tetrachords: *graves* (*g, a, bb, c); *finales*
(*d, e, f, g*); *superiores* (*a, bb, c, d*); and *excellentès*
(*e, f♯, g, a*).

27. lit., "first" or "lower."

28. lit., "of the middle."

29. lit., "middle."

30. Original text: *iuxta mediam*.

31. Original text: *prope nētēn*.

32. lit., "through the whole" or "concerning the
whole."

33. The Thracian priest that Virgil describes is
Orpheus, who plays the seven pitches on the seven-stringed
lyre to the strains of the dancing and singing people
discussed in the previous verse: *Pars pedibus plaudunt
choreas et carmina dicunt* (*Aeneid*, Book VI, Verse 644). In
the verse that follows Ramos's quotation, it is clear that
the priest is playing a stringed instrument because Virgil
describes the plucking of the strings with the fingers or an
ivory quill: *iamque eadem digitis, iam pectine pulset
and Frank J. Miller, *Six Books of the Aeneid of Virgil* (New

34. lit., "tones."
35. As opposed to a difference in sound, this refers to a difference in the amount of space between these letters on the extended string of Figura 1.


37. Wolf notes that the last five pitches are not marked as the *superacutae* with the usual small doubled letters.


39. The literal translation of this passage is rather ambiguous. Ramos explains that the number six is considered to be perfect by mathematicians due to the fact that the numbers contained within it (i.e., 1, 2 and 3) can be multiplied or added together to achieve the *senaria*. Ramos infers the mathematical operation of multiplication by the reference to *partes eius aliquotae*—an "aliquot" being the fractional part that is contained an exact number of times in something else—while the mathematical operation of addition is inferred by the use of *componunt* and *simul*. For further discussion of the *senaria*, see Gioseffo Zarlino, *The Art of Counterpoint*, Part 3 of *Le institutioni harmoniche*, 1558, trans. by Guy Marco and Claude V. Palisca, *Music Theory Translation Series* (New Haven, Conn.: Yale University Press, 1968), xix.

40. In treatises of the time, graves pitches were usually designated with capital letters, the acutae with lowercase letters, and the *superacutae* with doubled lowercase letters stacked vertically. Ramos generally uses lowercase letters to name the pitch, whereas the specific octave is identified via the solmization syllables. Again, we see Ramos's efforts to omit everything that is superfluous.

41. Odo, in the *Enchiridion musices*, explains the "dual nature" of the ninth step (here, Odo is counting from the prosclambanomenos rather than from *G* ut). The melodic
movement from $bb$ to $b\frac{1}{2}$ was never implemented chromatically. A singer could choose to sing $bb$ or $b\frac{1}{2}$ at the ninth step of the gamut, but never both. The following excerpt demonstrates Odo's viewpoint: "Yet the first and second ninth steps, $bb$ and $b\frac{1}{2}$, form with respect to one another neither a tone nor a semitone, but from the first ninth step, $bb$, to the eighth [step], $a$, is a semitone, and to the tenth [step], $c$, is a tone; conversely, from the second ninth step, $b\frac{1}{2}$, to the eighth [step], $a$, is a tone, and to the tenth [step], $c$, a semitone. Thus one of them is always superfluous, and in each melody you accept one and reject the other in order not to seem to be making a tone and a semitone in the same place, which would be absurd." See Oliver Strunk, *Source Readings in Music History* (New York: W.W. Norton and Company, Inc., 1950), 107.

42. The Spaniard Tristan da Silva seems to be one of the few musicians that Ramos maintained a friendship with even though they had differing points of view on various musical topics. Da Silva was active in Portugal as a poet and musician, and served at the court of Alfonso V.

43. Boethius, *De institutione musica*, Book I, Chapter 20: "But since the mese . . . ." This sentence does not appear at the beginning of the chapter, as Ramos states, but rather in the eighth paragraph. See Friedlein edition, 211, line 21.

44. Ibid., Book IV, Chapter 9: "Certainly there are two tetrachords which are conjunct with each other but disjunct from mesē . . . ." See Friedlein edition, 327, line 10.

45. i.e., Marchettus of Padua.

46. Wolf notes that Marchettus does not give the tetrachord division that Ramos attributes to him. In the *Lucidarium*, Treatise XIV, Marchettus divides the gamut into *graves*, *acutae*, and *superacutae* with the added *e la*, and in the following treatise gives the usual Greek tetrachord division with *I ut*. See Martin Gerbert, *Scriptores ecclesiastici de musica sacra*, vol. III (San Blascinis, 1784; reprint, Milan: Bollettino bibliografico musicale, 1931), 120.

47. A conservative fifteenth-century French theorist and humanist, also known as Johannes Legrense, Johannes Gallicus, or Johannes Mantuanus. Ramos, Gaffurius, Spataro, and Burtius are all believed to have studied with him.
48. lit., "He is both untrained and in need of the rod," i.e., physical punishment. Terni has misinterpreted this passage, translating this phrase as "[Marchettus] needs a cane to hold himself up." Here, Carthusiensis is referring to the veracity of Marchettus's theory, not his physical stamina. See Johannes Carthusiensis's Ritus canendi vetustissimus et novus (Coussemaker, Scriptorum IV, 324a and 349b).

49. Ramos concludes his attack with a double entendre: the word marchetos refers both to the theories of Marchettus and to the value of the Venetian coin (the marchetto). At the same time, he alludes to the four additions of Roger Caperon as the "four marchetti."

50. Although Ramos refers to the thirteenth-century theorist Roger Caperon as "Gallus" (the Frenchman), he is usually cited in other sources as "Anglicus" (the Englishman). Caperon's treatise on the Guidonian hexachord and the ecclesiastical modes—including this passage cited by Ramos concerning the extensions above and below the Guidonian gamut—can be found in the fifteenth-century manuscript MS D39 of the Biblioteca riunite Civica e A. Ursino Recupero in Catania, Sicily. See also James Haar, "Roger Caperon and Ramos da Pareia," Acta Musicologica 41 (1969): 26-36.

51. Wolf notes that the terms coruph, synemmenon, apotome, and crisis are derived from the Greek terms χορυφή, συνημμέναν, ἀποτομή, and χρισίς.

52. Philolaus of Croton (early 5th century B.C.) was one of the most revered Pythagorean philosophers. The three "means"—arithmetic, geometric, and harmonic—have been attributed to Hippasus, Philolaus, and Archytas (his teacher), respectively.

53. The term "monochord" was also used to refer to multi-stringed instruments, such as those mentioned by Ramos in this chapter.

54. Terni notes that Ramos emphasizes that in high sounds, it is not so much the thickness of the string that lowers the intonation, but rather the lack of tension in the string itself.

55. lit., "perfect instruments"; Ramos uses this term to denote chromatic instruments.

56. A reference to the division $h-i$ ($a-b\flat$), which produces the pitches $a$, $b\flat$, and $b\sharp$. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
57. i.e., to pass through two semitones.

58. i.e., wind instruments.

59. The fistula (σῷριγς) is a "shepherd's pipe," sometimes referred to as a "Pan pipe," made of several reeds that gradually decrease in length and calibre. The sambuca (σαμβοκάγιο) is a triangular string instrument with a very sharp, shrill tone; it usually accompanies the tibicina, an early form of the flute. In this discussion of wind instruments, it is possible that Ramos confuses the sambuca with the tibicina.

60. A reference to the pitches of the overtone series that can be produced by variances in breath control. Wolf notes that this sentence makes sense only if one assumes that Ramos did not start on the fundamental, since he claims the possibility of the bisdiapason sub aut supra.

61. i.e., ile.

62. lit., "the instrument that is made by art."

63. Because Ramos's quotation here (Chapter VIII of the Musica Enchiriadis) is imprecise, Wolf suggests that Ramos may have been quoting from memory rather than from the treatise itself: "... utpote Noannoeane et Noeagis, et caetera, quae putamus non tam significativa esse verba quam syllabas modulationi attributas." See Gerbert, Scriptores I, 158b.

64. These syllables are taken from the A-80 edition. In A-81, Ramos lists the syllables in this order with the exception that tri is substituted for tu on the first syllable, resulting in a repetition of the syllable tri on the first and the fifth tones. Wolf lists the syllables as tri, pro, de, nos, te, ad, do, based upon Georg Lange's article, "Zur Geschichte der Solmisation," Sammelbände der Internationalen Musik-Gesellschaft i (1899-1900): 543ff.

65. lit., "should be ridiculed."

66. In the Excitatio quaedam musicæ artis per refutationem, Johannes Hothby has a sarcastic reaction for Ramos's use of the syllable "is" to denote both b♭ and b♮: "... saltem de tuo nomine igitur feras laudem, quoniam tam pro b rotunda quam pro b quadrata idem omnino sentire decrevisisti." Translation: "... at least you may receive praise concerning your name is, since [in proposing] round b [to be] the same thing as square b, you have lost [your] senses entirely." See Albert Seay, Johannis Octobi tres

67. lit., "It is sung through these voices."

68. The meaning of this sentence becomes clearer in Part 1, Treatise 2, Chapter 5: "In Hispania vero nostra antiqua monochorda et etiam organa in c grave repperimus incepisse." Translation: "But in Spain we find our ancient monochords and also our organs to begin on c grave." Thus, for Ramos, sound begins on c.

69. i.e., a to b♭, b♭ to b♯, and b♯ to c.

70. Mediate translates lit., as "through the middle," and immediate as "not through the middle" (i.e., "by step" and "by leap," respectively).

71. Ramos never returns to a discussion of the metrical feet nor their relationship to the tropes. Guido, however, discusses them briefly in the Micrologus: "The parallel between verse and chant is no slight one, since neumes correspond to feet and phrases to lines of verse. Thus one neume proceeds like a dactyl, another like a spondee, and a third in iambic manner; and you see a phrase now like a tetrameter, now like a pentameter, and again like a hexameter, and many other such parallels." See Claude V. Palisca, ed., Hucbald, Guido, and John on Music, trans. by Warren Babb (New Haven, Conn.: Yale University Press, 1978), 72.

72. Although he does not explicitly state his intentions here, Ramos's recommendation of vocal exercises ascending from c-g (psal-li-tur-per-vo), and then from g-c (vo-ces-is-tas), suggests that he favors a harmonic, rather than an arithmetic, division of the octave.

73. lit., "the place for the teeth."

74. Chapters 7 and 8 are combined in the A-81 edition.

75. i.e., the number of the planets are seven: the Moon, Mercury, Venus, the Sun, Mars, Jupiter, and Saturn.

76. A reference to the six syllables of Guido's hexachord system.
77. A reference to *musica mundana*, alternatively referred to as "cosmic music" or "the music of the spheres." Ramos follows the order established by Cicero rather than that of Boethius (Boethius organizes these in the opposite order, with the highest sound—*nētē*—corresponding to the moon). See Bothieus, *De institutione musica*, Book I, Chapter 27, Friedlein edition, 219.

Cicero discusses the harmony that results from the orbit of the planets at length in *De re publica*, Book VI, Chapters 17-19. For other discussions, see: Macrobius, *De somnium Scipionis*, Book II, Treatise 1, Chapter 2 and Book VI, Chapters 1-6; Nicomachus, *Enchiridion* Book III; Plutarch, *De musica* 1147; and Ptolemy, *Harmonica* Book III, 10-16 and 104-11.

78. Terni notes that Ramos is alluding here to the two main culprits that strip music of its perfection and fullness: the Greek tetrachord—which divides or "truncates" the octave into two parts—and Guido's hexachord—which "diminishes" it to six voices.

79. Ramos takes this definition from Boethius, *De institutione musica*, Book I, Chapter 3. See Friedlein edition, 189, line 22.

80. Following Boethius, Ramos makes the distinction between *continua* (συνεχής)—a continuity of sound without discrete pitches and *discreta* (διαστηματική)—a continuity of sound with definite, discrete pitches. Boethius further defines these concepts with the Latin terms *continua* and *suspensa*, respectively. However, Boethius's use of the term *suspensa* provides a much clearer definition, because this term implies both a "sustaining" and "interruption" of the melody by means of the intervals. See Boethius, *De institutione musica*, Book I, Chapters 12 and 13, Friedlein edition, 199-200.

81. Ibid.

82. The Latin singular noun *modulus* is generally translated as "interval"; however, its plural form implies a succession of intervals, i.e., melody. The use of the gerundive here suggests the act of "making a melody."

83. The writings of Albinus on music are no longer extant. Boethius, however, cites Albinus concerning the third classification of the voice in the *De institutione musica* along with citations of his writings on geometry and logic in *In librum Aristotelis de interpretatione editio secunda, seu maiora commentaria*. 

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
84. See Boethius, *De institutione musica*, Book I, Chapter 14, Friedlein edition, 200.

85. Period choral books demonstrate that a five-line musical staff was already being used in Spain; other countries (including Italy) were still using a four-line staff.

86. The Latin word claves may be translated literally as "keys"; however, it is obvious that Ramos is referring to the musical "clefs," which denote the pitches that are assigned to various lines and spaces of the musical staff. It is interesting to note that these early clef signs resemble the end of a skeleton key; this may be the reason they were referred to as claves.

87. "Multi volentes . . . " is a reference to Ramos's own Chapter 7 in Part 1, Treatise 1. It is here that Ramos first discusses his solmization method and introduces pedagogical exercises for sight singing.

88. Ramos describes the semitone in terms that the practicing musician could understand, i.e., in regard to its aural effects (softer, harder), rather than providing a speculative explanation with complicated proportions.

89. A reference to Philippotus Andreas (?), a composer and theorist of the fourteenth century who is credited with *De contrapuncto quaedam regulae utiles*. See Coussemaker, *Scriptorum*, III, 116f.

90. lit., "One is musica ficta."

91. In Treatise 8, Chapter 2 of the *Lucidarium*, Marchettus of Padua states that round b, square $\flat$, and $\natural$ are specifically designated for different types of music: "Signa autem, quibus notis innuitur permutationem facere, sunt tria, scilicet $\flat$ quadrum, $b$ rotundum et aliud signum, quod a vulgo falsa musica nominatur; de quibus videre oportet. Prima namque duo signa, scilicet $\flat$ et $b$ sunt, vel esse possunt in quolibet cantu plano ac etiam mensurato. Tertium vero signum solum in cantu ponitur mensurato, vel in plano, qui aut colorate canatur, aut in mensuratum transit, puta in tenoribus Motetorum seu aliorum cantuum mensuratorum. De primis duobus signis ait Richardus Normandus: ubicunque ponitur $\flat$ quadrum, dicimus vocem MI, ubicunque vero $b$ rotundum, dicimus vocem FA." Translation: "However, there are three signs by which one may bring about a permutation, namely, $\flat$ quadrum, $b$ rotundum, and another sign, which is commonly called falsa musica. For the first two signs—that is, $\flat$ and $b$—are found or can be found in
plain song and also in measured [music]. But the third sign is only placed in measured song, although it may be placed in plain [song] if it is sung with coloration or used in a mensurable manner, as in the tenors of motets or [in the tenors] of other measured songs. Concerning the first two signs, Richard of Normandy said: Wherever $\frac{1}{4}$ quadrum is placed, we call the note MI; wherever $\frac{1}{b}$ rotundum is placed, we call the note FA."

Although according to the above citation it appears that Marchettus would have been in agreement with Ramos on this matter, Marchettus believed that the whole tone consisted of five dieses and, therefore, the signs round $b$, square $\frac{1}{b}$, and $\#$ represent three separate entities: the enharmonic semitone $a$ to $b\frac{1}{b}$ (consisting of two dieses), the diatonic semitone $b\frac{1}{b}$ to $b\frac{1}{2}$ (consisting of three dieses), and the chromatic semitone $c$ to $c\#$ (consisting of four dieses). For Ramos, the signs round $b$, square $\frac{1}{b}$, and $\#$ all represent the same distance—that of a semitone.


93. Wolf concludes Part 1, Treatise 2, Chapter 2 here and introduces Chapter 3, which he entitles De coniunctarum cognitione. However, the original editions (A-80, A-81, and A-7-35) have no indication of a third chapter at this point. Part 1, Treatise 2, Chapter 2 proceeds to Chapter 4 without any mention of Chapter 3; either this is a mistake on Ramos's part, or Chapter 3 was missing upon the publication of the Musica practica.

94. Ramos makes no distinction between the major and the minor semitones; such a concept of equally-valued semitones would have been very difficult for his contemporaries to accept.

95. Ramos uses the nouns mutatio and permutatio interchangeably to denote the process of mutation, i.e., the substitution of one syllable for another in the Guidonian gamut.

96. See Tinctoris, Terminorum musicae diffinitorum, s.v. "Mutatio," 44.

97. i.e., $fa$ ut is used for ascending through the gamut; $ut$ $fa$ is used for descending.

98. Gaffurius's marginal annotation: "In $b$ $fa$ $\frac{1}{b}$ mit fit permutatio secundum Marchetum, quod et in Practica nostra declaramus, $ut$ hoc etiam probatur exemplo:" [example]. Translation: "According to Marchettus, a
mutation is made on $b\,fa\,h\,mi$, as it is demonstrated in this example, which we explain as well in our Practica:

99. i.e., on $g\,sol\,re\,ut$: $sol-re,\,re-sol;\,sol-ut,\,ut-sol$; and $re-ut,\,ut-re$.

100. i.e., the "natural hexachord" consists of the pitches $c\,d\,e\,f\,g\,a$, the "hard hexachord" consists of the pitches $g\,a\,b\#\,c\,d\,e$, and the "soft hexachord" consists of the pitches $f\,a\,b\#\,c\,d$.

101. Gaffurius's marginal annotation: "Sexta mutatio in $G\,sol\,re\,ut$ scilicet $ut$ in $re$, fit directe et regulariter descendendo ut hic: [example]. Ecce quod in huius exempli quinta notula mutatur ut in $re$ descendendo per regularem et directam mutationem. In secunda autem alterius exempli notula mutatur irregulariter et indirecte ut in $re$ scilicet ascendendo. Haec autem latius rationabiliterque in primo Practicæ nostræ aperta sunt." Translation: "The sixth mutation on $g\,sol\,re\,ut$—that is, $ut$ to $re$—is made in a direct and regular way for the purpose of descending in this way:

primum ex. aliud ex.

Notice that $ut$ is changed to $re$ on the fifth note of this example for the purpose of descending by means of a regular and direct mutation. However, $ut$ is changed to $re$ on the second note of the other example in an irregular and indirect way, that is, for the purpose of ascending. And these things are shown rationally and in much more depth in the first [book] of our Practica."

102. Obviously $fa$ cannot be joined with $mi$ because this combination would occur by means of a semitone. Ramos allows only a syllabic order in which the notes are distant by a tone, a diatessaron, or a diapente.

103. By "its left side," Ramos is referring to the diagram from the teacher's perspective, as if one were handing the diagram to the student. From the reader's
perspective, "its left side" is actually the right side of the diagram.

104. All three editions (A-80, A-81, and A-7-35) indicate that the figure is placed in the preceding margin—"praecedenti margine posita"; the figure is actually located on the same page as this text.

105. i.e., segment.

106. i.e., the first soft b coniuncta.

107. Ramos most likely is alluding to the practice of creating keyboards that contain the C/E short octave by omitting certain accidentals in the lowest octave. This practice was justified by: (1) the lack of demand for certain accidentals in the low range; (2) by the substantial financial savings incurred when some of the larger bass pipes on the organ could be omitted; and (3) by the fact that the re-assignment of the pitches to other keys made the larger intervals more attainable within the player's hand span. The extant sixteenth-century keyboards with C/E short octaves demonstrate that the eight pitches below c grave are typically arranged in the following manner: B♭, B♮, A (proslambanomenos), G (Γ ut), F (retropolis) would have been placed at their normal positions on the keyboard, E would have been placed where G♯ usually appeared, D would have been placed where F♯ had been, and C would have been placed in the position that had formerly been occupied by the pitch E. This remark by Ramos regarding a keyboard instrument in Bologna with a range that includes the eight notes below c grave is much more important than it may initially seem on the surface. This comment suggests the existence of the bass short octave in practice much earlier than the first descriptions that appear in the musical treatises of Nicola Vicentino and Juan Bermudo of 1555. See Standley Howell, "Ramos de Pareja's Brief Discussion of Various Instruments," Journal of the American Musical Instrument Society XI (1985): 14-37. For a completely different perspective regarding the meaning of this passage, see Nicolas Meeus, "Bartolomeo Ramos de Pareia et la tessiture des instruments à clavier entre 1450 et 1550," Revue des archéologues et historiens d'art de Louvain v (1972): 148-172.

108. i.e., these instruments only have recta (white keys) as opposed to ficta (black-key accidentals) from Γ ut down to the C below.

109. lit., "sweetness of honey."
110. lit., "the difference of music."

111. In the treatise *Excitatio quaedam musiceartis per refutationem*, Johannes Hothby refutes the statements from this chapter of the *Musica practica*. He quotes Ramos directly, citing Part 1, Treatise 2, Chapter 6. For Hothby, the difference in music is based upon quality as well as quantity.

112. Ramos is referring to Pedro de Osma (ca. 1427-80), who was a professor at the University of Salamanca from 1457-78.

113. A Spanish theologian of the fifteenth century.

114. Terni notes that this sentence demonstrates the typical viewpoint of the period: only those things that were written had any real value.

115. Ramos refers to this theorist as Johannes Ottobi, but present-day musicologists usually refer to him as Johannes Hothby.

116. In the treatise *Excitatio quaedam musiceartis per refutationem*, Hothby rejects the statement that he adopted the numbers on his monochord from Boethius. He notes that although his chromatic and enharmonic genera are identical to those of Boethius, his own division of the monochord differs from Boethius in the diatonic genus due to the addition of pitches to the higher and lower ranges of the monochord.


118. i.e., Pedro de Osma.

119. Gaffurius's marginal annotation: "Hic se multum iactat auctor." Translation: "Here the author boasts a great deal!"

120. This division of the chromatic and enharmonic genera is the same division that Boethius presents in *De institutione musica*, Book I, Chapter 21, Friedlein edition, 212-13.

121. lit., "a perceived ditone." Ramos uses this term to demonstrate that although the pitches a−c appear to be a semiditone, this interval is actually perceived as the ditone a−c by means of *musica ficta*. 

---

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
122. lit., "perceived semitone."

123. If b mi is changed to re, then mi will be placed upon c, which will in turn be sung as c♯, and fa will follow on d. Although Ramos claimed at the end of the previous chapter that a semitone does not always occur between mi and fa, in this instance he employs the syllables mi and fa to carry out his argument of the ditonus subintellectus.

124. Here Ramos uses the nominative form—Johannes Carthusinus. Present-day musicologists usually refer to him by the genitive form—Johannes Carthusiensis.

125. lit., "I do not proclaim it a mutation of note to note, but I call it a variation from digression to digression."

126. See Coussemaker, Scriptorum IV, 347b, 349b, and 374f.

127. Gaffurius's marginal annotation: "Etiam per voces Guidonis possimus cantare tetrachorda disiuncta triplici videlicet diatessaron consideratione sine mutatione." Translation: "We are also able to sing the three disjunct tetrachords by means of the syllables of Guido, namely with a consideration of the diatessaron without mutation."

128. Ramos's single mutation of psal-tas only effects the syllable; it does not effect the pitch.


130. lit., "of the medicinal [finger]," i.e., the finger next to the little finger.

131. lit., "with [the finger] of the ear," i.e., the finger used to clean the external part of the ear.

132. This annotation is directed toward the printer regarding the placement of the hand. In all three editions (A-80, A-81, and A-7-35), however, the figure was placed on the following page.

133. Gafurrius's marginal annotation: "Hic posset argui, quoniam toni non semper videntur aequales, quod aperte monstratur in divisione monochordi. Nam tonus in graviori loco maiorem quantitatem chordae comprehendit, quam qui in acutiori distenditur." Translation: "This could be
refuted, since the tones do not always appear to be equals, which is clearly shown in the division of the monochord. For the tone in the lower range comprises a greater quantity of the string than when it is divided in the higher [range]."

134. See Boethius, *De institutione musica*, Book IV, Chapter 14, Friedlein edition, 337, line 22.

135. i.e., the unison.

136. Ramos's view on the equality of the tritone and the semidiapente is quite different from his contemporaries, who justified the use of the semidiapente but refused to accept the tritone in composition.

137. Ramos demonstrates the typical inward melodic resolution of the diminished fifth.


139. The species of the diapente and diatessaron are based upon the position of the semitone. The four species of the diapente are based upon the rearrangement of the semitone within an octave, thus:

1st species = scale steps 1-5, semitones between 3 & 4.
2nd species = scale steps 2-6, semitones between 2 & 3.
3rd species = scale steps 3-7, semitones between 1 & 2.
4th species = scale steps 4-8, semitones between 4 & 5.

The three species of the diatessaron are based upon the rearrangement of the semitone within an octave, thus:

1st species = scale steps 1-4, semitones between 3 & 4.
2nd species = scale steps 2-5, semitones between 2 & 3.
3rd species = scale steps 3-6, semitones between 1 & 2.

140. Gaffurius's marginal annotation: "Imo linea et spatium in cantilenis et cantu plano differentiam probant acuminis et gravitatis distantiam diponentes." Translation: "On the contrary, in cantilenas and plain song the line and the space show the difference [of music], arranging the distance of the high and the low."


142. Gaffurius's marginal annotation: "Imo omnino differunt." Translation: "On the contrary, they differ altogether."
143. Gaffurius's marginal annotation: "His ignotis deductionibus confunditur, quod in manu Guidonis facilitate percipitur." Translation: "That which is easily understood with Guido's hand is obscured by these ignorant deductions."

144. See Boethius, De institutione musica, Book IV, Chapter 15, Friedlein edition, 341, lines 19ff.

145. Ibid., Book I, Chapter 1, Friedlein edition, 180, lines 17ff.

146. Gaffurius's marginal annotation: "Facilius introducuntur ad hanc cognitionem iuvenes institutione Guidonis quam solis alphabeti litteris ibi dispositis." Translation: "The young are more easily introduced to this idea with Guido's method, which is arranged there with only the letters of the alphabet."

147. lit., "first authentic."

148. lit., "the plagal of the first."

149. Again, Ramos is referring to Johannes Carthusiensis. See Coussemaker, Scriptorum IV, 324a and 349b.

150. Gaffurius's marginal annotation: "Haec opinio, licet veritati adhaereat, facile posset impugnari." Translation: "Although this opinion adheres to the truth, it could easily be attacked."

151. A reference to the fifteenth-century Spanish theorist, Luis Sánchez (?).


153. See Boethius, De institutione musica, Book I, Chapter 1, Friedlein edition, 185, lines 27-186.


155. See Boethius, De institutione musica, Book I, Chapter 1, Friedlein edition, 181, lines 5-7.
156. A town in the eastern part of Sicily, now Taromina, also called Tauromenon. See Lewis and Short, A Latin Dictionary, 1844.

157. See Boethius, De institutione musica, Book I, Chapter 1, Friedlein edition, 184, lines 10ff.

158. i.e., Marcus Tullius Cicero.

159. Boethius provides this comparison of the strings to the disposition of the planets, which was given by Marcus Tullius Cicero in De re publica, Book VI, Chapter 18; however, Boethius arranges them in a different order: "The hypatē mesōn is assigned to Saturn, whereas the parhypatē [mesōn] is like the orbit of Jupiter. The lichanos mesōn is entrusted to Mars. The sun governs mesē. Venus holds the trite synēmmenōn. Mercury rules the paranētē synēmmenōn. The nētē is analogous to the moon's orbit." See Boethius, De institutione musica, Book I, Chapter 27, Friedlein edition, 219, lines 6-9.

160. i.e., the Greek poet.

161. i.e., Mnemosyne, Jupiter's wife, mother of the Muses; often referred to as "the goddess of memory."

162. Martianus Mineus Felix Capella: a learned grammarian of Madaura, Africa who flourished during the second half of the fifth century; best known for his allegory De nuptiis Philologiae et Mercurii, in which he discusses the seven liberal arts.

Aurelius Macrobius Ambrosius Theodosius: a Roman grammarian who flourished at the end of the fourth century; author of a treatise entitled Convivia Saturnalia, and of a commentary on Cicero's Somnium Scipionis.

163. The attributes of the nine Muses are as follows: Thalia is the Muse of comedy, Clio of history, Calliope is the chief of the Muses and the goddess of epic poetry, Terpsichore of dancing, Melpomene of tragic and lyric poetry, Erato of lyric and amorous poetry, Euterpe of music, Polyhymnia is the Muse of many hymns, and Urania is the Muse of astronomy. See Lewis and Short, A Latin Dictionary, s.v.

164. Because of his association with the tropes, Wolf suggests that the "Saint John" to whom Ramos refers may be Johannes Damascenus.

165. Gaffurius's marginal annotation: "Hic declaratur quod natura ducit nulla ratione deducitur."
Translation: "Here it is declared that whatever nature produces [cannot] be deduced by reason."

166. See Boethius, De institutione musica, Book I, Chapter 3 and Chapter 8, Friedlein edition, 191, lines 3-4, and 195, lines 6-10.


169. Gaffurius's marginal annotation: "Melius est, per mutationem semitonii in tonum vel e converso non mutant consonantiam; nam tertia per additionem vel subtractionem semitonii redigitur in quartam vel in secundum." Translation: It is better [to say] that they do not change [their] consonance by means of the mutation of a semitone into a tone or vice-versa; for the third is made into a fourth or a second by the addition or subtraction of a semitone.

170. For both Boethius and Ramos, proportiones refers to "ratios" while proportionalitates refers to "proportions."

171. The Latin word lac is generally used to refer to "milk." Ramos uses the word lacticinia here to refer to a type of dish that is prepared with milk and eggs.

172. i.e., a compound of a compounded thing, or from the compound.

173. In the A-80 edition of the Musica practica, Gaffurius has marked the following chart at the bottom of page 50 (the "figure" to which Ramos must be referring):
Perfectissime aequisone Perfecte Et ad hunc modum non est statum

<table>
<thead>
<tr>
<th>CONSONANTE</th>
<th>22a</th>
<th>24a</th>
<th>26a</th>
<th>27a</th>
<th>Superdecomposite</th>
</tr>
</thead>
<tbody>
<tr>
<td>15a</td>
<td>17a</td>
<td>19a</td>
<td>20a</td>
<td></td>
<td>Composite</td>
</tr>
<tr>
<td>8a</td>
<td>10a</td>
<td>12a</td>
<td>12a</td>
<td></td>
<td>Simplices</td>
</tr>
<tr>
<td>uniquono</td>
<td>3a</td>
<td>5a</td>
<td>6a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>major</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>minor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>imperfecte</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>imperfecte</td>
</tr>
</tbody>
</table>

Simplices dicte sunt quia sunt puerilia.

Translation: The simple [consonants] are mentioned because they are the source.

174. Gaffurius's marginal annotation: "Quinta et quarta multum differunt; nam una consonat per se et alia dissonat per se scilicet, dum simpliciter deducuntur." Translation: "The fifth and fourth differ greatly; for one is intrinsically consonant and the other is intrinsically dissonant—that is, provided that they are composed in a simple manner."

175. Gaffurius's marginal annotation: "Ego autem in tertio Practicae nostrae, qui contrapunctus inscribitur, consonantias huiusmodi ternaria distinxii progressione. Alias etiam dico perfectas, alias imperfectas aliasque medias auctoritatibus quorundam veterum et multis ductus rationibus." Translation: "I, however, in the third book of our Practica which is entitled "counterpoint," distinguished consonants of this kind with a three-fold progression. For I call some "perfect [consonants]," some "imperfect [consonants]," and others "intermediate [consonants]," based upon the authorities of some of the ancients and the many theories that have been established."

176. Gaffurius's marginal annotation: "Hic pulcherrima et longa subtilisque disputatio nascitur." Translation: "Here the most beautiful, lengthy, and subtle dispute is born."
177. Gaffurius's marginal annotation: "Incontrariam saepius servatur supra illud carmen: Debile principium melior fortuna sequetur. Nam finis est perfectio rei, non autem principium, ut Aristoteli placet." Translation: "On the contrary, it is observed more frequently than just that song Debile principium melior fortuna sequetur. For the end, not the beginning, is the perfection of a thing, as it is pleasing to Aristotle."

178. Appendix A and B provide examples in modern notation of counterpoint and fugue as discussed by Ramos in this chapter.

179. Gaffurius's marginal annotation: "Sententia est Aristotelis in problematibus praeauditum cantum magis delectare." Translation: "It is the opinion of Aristotle, that one delights more in the enigmas of the song that has been heard before."

180. Gaffurius's marginal annotation: "Hoc non semper servandum est, sed locis et temporibus congruis atque semper disponendum est locis necessariis arte et natura disponente." Translation: "It should not always be observed in this way, rather it should always be distributed in the necessary places at suitable locations and times, by arranging it according to art and nature."

181. Appendix C provides examples in modern notation of counterpoint as discussed by Ramos in this chapter.

182. In Book II, Chapter 26 of his Declaratio musicae disciplinae, Ugolino of Orvieto offered rules of counterpoint that are virtually repeated by Ramos in this passage. Ugolino included musical examples to illustrate these rules --rules with which Ramos later takes issue in his discussion of counterpoint. See Appendix D of this dissertation in order to compare Ugolino's rules and musical examples with those given by Ramos in this chapter.

183. Ramos has replaced the word cantum here with tantum.

184. Ugolino uses the accusative form tertiam at the beginning of the sentence rather than the ablative form tertia that Ramos employs. Because the form of this word changes the meaning of the sentence, I have chosen to use Ugolino's accusative form in order to give the reader a better understanding of the actual meaning of this rule.

185. Ugolino: "Quinta tibi fiat, si terna solam remittat"; the sense remains the same.
186. Ugolino: "Quinta sexta fiet, si cum octava iungatur."

187. Ugolino: "Unisonum dicas, si ternam vel quartam intendas"; his musical examples illustrate the tenor moving by either a third or a fourth, rather than by a third or a fifth as Ramos states.

188. Ugolino: "Vult decimam sexta tertiam remittens ad infra"; his statement suggests that the tenor descends by a third, rather than by a third or more as Ramos states.

189. Gaffurius's marginal annotation: "Hic se excusat auctor non probasse propositas concordantias contrapuncti." Translation: "Here the author excuses himself for not having proven the concordant propositions of counterpoint."

190. Gaffurius's marginal annotation: "Hic litterarum processus consonantiarum potius cantores confundit quam instruit. Sanior quidem et perceptu facilior est progressio guidonicis institutionibus deducta et numerositatis consonae vocabulis denominata." Translation: "Here the progression of the consonant letters confuses rather than instructs the singers. Certainly the progression deduced from Guidonian principles and named with the appellations of consonant harmony is more reasonable and more easily understood."

191. i.e., ♭ mi.

192. Ramos did not discuss these matters in Part 1, Treatise 3 of the Musica practica. Perhaps he is referring to a section in one of his other works, such as his Introductorium or Isagoge.

193. i.e., from neither modulari ("modulating") nor movere ("moving"), but from modificatio ("modification").

194. See Coussemaker, Scriptorum I, 118b.

195. lit., "uttering."

196. Gaffurius's marginal annotation: "Quod potest scribi, potest et pronuntiari; non autem e contrario ut sibila, quae proferuntur et scribi non possunt. Non est absurdum scribi non posse quod potest pronuntiari, quia soni pronuntiantur in praeteritum tempus praeterfluentes. Hinc mandantur memoriae, ne pereant, quia scribi non possunt. Et est sententia Rhabani Mauri et Isidori." Translation: "Whatever can be written can also be sung; however, the
opposite is not [true], such as whistlings which can be produced but cannot be written. It is not absurd that what can be sung is not able to be written, because sounds are sung passing beyond into past time. These [sounds] are committed to the charge of memory lest they be lost, since they are not able to be written. [This] is also the opinion of Rhabanus the Moor and of Isidore."

197. Gaffurius's marginal annotation: "Inaudita et intolerabilis, iudicio meo, duplicis prolationis demonstratio." Translation: "In my opinion, the representation of a duple prolation is unheard of and intolerable!"

198. Gaffurius's marginal annotation: "Imo rectius maxima quam duplex longa dicitur, cum, perfectione moduli computata, tres longas possidere iudicetur. A nonnullis item antiquorum sic figurabatur ." Translation: "On the contrary, it is more correctly called maxima rather than duplex long, since, with the perfection of the measure having been calculated, it will be considered to possess three longs. It was also represented by some of the ancients in this way: ."

199. Psalms 90:4. Ramos quotes from scripture to make a pun here: Time is brief, and thus the tempus is a breve.

200. Gaffurius's marginal annotation: "Semibrevis minoris prolationis tam in tempore perfecto quam imperfecto semper est aequalis; nam semper duas minimas aequales comprehendit." Translation: "The semibreve of the minor prolation is equal as much in tempus perfectum as in tempus imperfectum; for it always contains two equal minimas."

201. See Johannes de Muris's Quaestiones super partes musicae (Gerbert, Scriptores III, 301 and Coussemaker Scriptorum III, 103).

202. See Johannes de Muris's Musica practica (Gerbert, Scriptores III, 292b ff.).

203. Gaffurius's marginal annotation: "Ego firmiter contrarium teneo evidentioribus procedens rationibus." Translation: "I strongly hold to the contrary, proceeding with much clearer reasons."
204. Gaffurius's marginal annotation: "Hic prolationem conducit per punctum in centro, superius autem per punctum divisionis reducibilis." Translation: "Here he assembles the prolatio by means of a point in the center; however, [he assembles it] above by means of a point of the reducible division."

205. Terni notes that Ramos is in complete disagreement with both Gaffurius and Tinctoris in his support for the principle of dividing the tempus. He is also in disagreement by his affirmation (as Spataro will also later emphasize) that it is not possible to derive the breve or the semibreve from the sum of the minims.


207. Gaffurius's marginal annotation: "Errant perfecto, qui notularum proprietatem quantitativam viciant et corrumpunt sine canone vel proportione." Translation: "Those who change and corrupt the quantitative property of the signs without rule or measurement err with respect to the perfect."

208. Gaffurius's marginal annotation: "Ego quidem Tinctoris doctrinam quam horum deductorum saniorem ipsa experientia didici, quamquam multas eius sententias iuridice impugnavi." Translation: "Although I have justly opposed many of his opinions; indeed, I have applied the teaching of Tinctoris which is more sound than the very practices of these teachers."

209. A section of this paragraph from "Et istud servat Ockeghem, Busnois, Dufay . . ." to "aliquando in minima" is quoted nearly verbatim in Book I, Chapter 38 of Pietro Aaron's Thoscanello. See Aaron, Thoscanello, fol. e3r.

210. Wolf notes that Spataro, in Chapters 17 and 31 of the Tractato di musica, refers to Urrdea as "Zoani (Giovanni) di Ubrede." The tenor of Urrdea's three-part composition Nunca fue pena mayor has been employed as a cantus firmus by many musicians; it may be found in Perugia, Bibl. Comunale, MS G.20. A Kyrie and Gloria by Urrdea are preserved in the archives of the Sistine Chapel of Rome, MS. 14.
211. Gaffurius's marginal annotation: "Nos autem ponimus pausam seminimae sic \[\text{\textsuperscript{CC}}\] , ut omnes sentiunt, semiminimae vero sic \[\text{\textsuperscript{DD}}\] ." Translation: "However, we establish the rest of the seminim in this way \[\text{\textsuperscript{CC}}\] , as everyone understands, but of the semiminim in this way \[\text{\textsuperscript{DD}}\] ."

212. i.e., by means of art. A term used in Franconian and Italian notation to denote that the rhythm is interpreted in an "artificial manner" rather than according to its natural grouping (via naturae). Departures from the established patterns are usually brought about by modifying the notes by means of a downward stem. In via naturae, the longer values appear at the end of a grouping; in via artis, the longer values are found at the beginning or in the middle of a grouping.

213. Gaffurius's marginal annotation: "Quid dicendum de notula longa, si nec trium spatiorum nec duorum apposita fuerit pausa ut hic: [example]." Translation: "This should be said concerning the long note if the rests neither of three nor of two spaces are placed nearby as [it is demonstrated] here:

\[\text{\textsuperscript{CC}}\] \quad \text{or in this way:} \quad \text{\textsuperscript{DD}}\]

214. Gaffurius's marginal annotation: "Nos aliter sentimus. Non enim semper signum perfectionis totam continet perfectionem, ut hoc et similibus exemplis constat: [example] vel sic [example]." Translation: "We believe otherwise. For the sign of perfection does not always contain the entire perfection, as it is ascertained in this and similar examples:

or in this way:

215. Gaffurius's marginal annotation: "Haec conclusio est falsissima; nam minima nunquam ternaria partitione non distinguitur, perfect scilicet quantitate computata, quia circa ipsam perfectum accidens quantitativum operari non potest, ut omnes imo sentiunt musici iudicio, quo fit, ut semper dividatur in duas semiminimas." Translation: "This conclusion is entirely false; for the minim is never distinguished by a third division—that is, calculated by a perfect quantity—since the non-essential quantitative perfect cannot be effectual among itself. Indeed, all musicians with discernment understand that this is done in order that it may always be divided into two semiminims."

217. Gaffurius's marginal annotation: "Circulus ad comparationem semicirculi augmentum indicat, sed ziphera 3 ad relationem zipperae 2 diminutionem ducit, quo fit, ut circulus et ziphera ternarii 03 diversimodis conducantur, quoniam augmentatione et diminutio ad invicem differre noscuntur. Ergo non idem significant, quod verum est." Translation: "The circle in comparison to that of the semicircle indicates augmentation, but a ziphera of 3 in relation to a ziphera of 2 forms a diminution. This is done so that the circle and the ziphera of the ternary O 3 are assembled in different ways, since they are known to differ from one another by augmentation and diminution. Therefore, it is true that the [two signs] do not signify the same thing."

218. Gaffurius's marginal annotation: "Imo aliud est ziphera numeri et aliud est circulus et consequenter diversimodis conducuntur et considerantur. Nam circulus et semicirculus tempus demonstrant perfectum et imperfectum et zippera ternarii vel binarii 3 2 numerum proportionabilem idest aptum ad alterum referri." Translation: "On the contrary, one is a ziphera of the number and the other is a circle, and consequently they are assembled and considered in different ways. For the circle and the semicircle demonstrate the perfect and the imperfect tempo; and the ziphera of the ternary or of the binary—that is, the appropriate proportional number 3 [or] 2—are of importance to each other."

219. Gaffurius's marginal annotation: "Hie recte sentit de signo prolationis." Translation: "Here he properly understands about the sign of the prolatio."

220. Wolf suggests that Ramos is referring to the theorist, E. de Murino. See Coussemaker's *Scriptorum*, III, 124.

221. Wolf notes that of the compositions by Ugolino that are preserved in Rome at the Bibl. Casanatense, Ugolino's work *Chi solo a si senza misura crede* in MS. c.II.3 (2151) displays the entire composition; however, only the top voice is legible due to water damage.
Wolf disagrees with Ramos, asserting that this practice may be observed in Italy at the turn of the fourteenth century, and cites its use by several musicians: Zacharias, Filipoctus de Caserta, Conratus de Pistoia, and Bartholomeus de Bononia.

This postulate does not appear in Franconian theory; one of the earliest examples may be found in Marchetti de Padua's Pomerium musicae mensuratae. See Gerbert, Scriptores III, 186b ff.

Gaffurius's marginal annotation: "Hic recte sentit et sanius quam supra, ubi tres trium temporum pausas ponit pro signo modi minoris perfecti." Translation: "Here he properly understands [the concept], and more rationally than before, where he establishes three rests of the three tempi in place of the sign of the minor perfect mode."

Gaffurius's marginal annotation: "Pluribus tamen cantilenis rumpitur [regula]; circulus et etiam duae ipsae semibrevis pausae pro signo temporis perfecti et rationabiliter fieri possunt sicque etiam duae pausae minimarum contiguae et punctus in circulo vel semicirculo ponuntur simul in prolacione perfecta disposita." Translation: "Nevertheless, in many songs [this rule] is broken—the circle and even two rests of the semibreves are able to be made in place of the sign of the tempus perfectum and more reasonably; and thus also two contiguous rests of the minims and a point within a circle or a semicircle are established at the same time, arranged within the prolatio perfecta."

Translation: It grows both in triple and in duple as it lies down.

Translation: Where alpha is, there is omega, and where omega is, there will be the end.

Translation: In the voice which is called "contra," thus the opposite is sung.

Translation: Do not sound c a c e with the tone fa; take the lichanos hypaton.

Translation: There the thesis may be taken where the arsis [was] and vice-versa.

Translation: The unison fugue of two [voices] is when the perfect number has been preserved.
232. Translation: Let the middle [voices] perform in harmony, and let any voice that comes along preserve its own melody.

233. Translation: It is sung in the perfection of the minims by means of the three genera of the melodies.


235. Part 1 of Ramos's Musica practica lacks a fourth treatise; Ramos discusses the three genera of melody in Part 1, Treatise 2, Chapter 6.

236. Translation: Let them descend as a stone into the abyss.

237. Translation: We raise our organa.

238. Translation: Eternal rest.

239. lit., So that they may rest from their labors; however, in the character of a riddle canon, this passage may be also be interpreted as "Ut" [and] "re" may rest from their labors.


241. Translation: If you hold with the master Agamemnon, you will lose no hairs from the head on paranētē and nētē synēmmenōn—that is, let their works follow all of them.

242. Translation: Let "ut" be quiet until it arrives at the desired place.

243. Translation: And just as his days are to be recompensed.

244. Translation: In the manner of the mercenary.

245. lit., Lest you remember; however, in the character of a riddle canon, the word recorderis may be divided, resulting in the following interpretation: No "re" will be on the string.
246. lit., Lest you reminisce; however, in the character of a riddle canon, the word reminiscaris may be divided, resulting in the following interpretation: Do not recall "re mi."

247. lit., May they rest in peace; however, in the character of a riddle canon, this passage may also be interpreted as May "re" rest in peace.

248. The term proportionalitas refers to a "proportion" whereas proportio refers to a "ratio."

249. i.e., the harmonic.

250. Ramos uses the word proportio here, but it is obvious within the context of the sentence that he is referring to the "proportion" (proportionalitas) rather than the "ratio."

251. The term habitudo refers to any relation between two numbers. Boethius employs this term in De institutione musica as an equivalent for the word proportio (ratio). See Boethius, De institutione musica, Book II, Chapter 1, Friedlein edition, 227, line 13.

252. i.e., the government by the few—the aristocracy.

253. lit., "of the people."

254. The word epitrita is taken from the Greek ἐπιτρῖτα, meaning one and a third (4:3—or the sesquitertian ratio).

255. i.e., the twelfth.

256. Boethius discusses these ratios in Book I, Chapter 16 of De institutione musica, Friedlein edition, 202, lines 17ff.

257. lit., "of twenty-four fingers"—an early means of measurement.


259. Wolf quotes Gaffurius's comment appearing on folio 62v of his De harmonia musicorum instrumentorum opus (Milan, 1518): "Duae itaque sesquioctavae sesquiquartam excedunt ea proportione, quae fit a numero 81 ad 80 . . . Hinc falso arbitratus est Bartholomeus Ramis Hispanus tertio.
tertii .tractatus suae practicae circa finem, qui integrum
ditoni intervallum in chordo tono sesquiquartae
indifferenter ascribit dimensioni. Nam ut Jacobus Faber
inquit, ditonus evenit inter sesquitertiam et sesquiquartam
intermedius." Translation: "Therefore, the two
that ratio which is produced by the number 81:80 . . .
Bartholomeus Ramis the Spaniard judged in error on this
account near the end of the third [chapter] of the third
treatise of his [Musica] practica, which indiscriminately
ascribes the entire interval of the ditone by a measuring of
the sesquiquartan [ratio 5:4] with a tone [produced] on the
string. For as Jacobus Faber said, the ditone falls in
between the sesquitertian and the sesquiquartan [ratios]."
Note: Since in Part 3 of the Musica practica, Ramos
incorrectly labels Part 3, Treatise 2 as Treatise 3 (or
possibly Part 3, Treatise 2 is missing in the printing of
the original manuscript), Gaffurius is actually referring to
this passage of the Musica practica when he speaks of the
"third chapter of the third treatise." See Franchinus
Gaffurius, De harmonia musicorum instrumentorum opus,
(1518), intro. and trans. by Clement A. Miller (Neuhausen-
Stuttgart, Germany: American Institute of Musicology,
1977), fol. 62v.

260. On folio 63r of De harmonia musicorum
instrumentorum opus, Gaffurius addresses yet another
disagreement with Ramos; however, this time it concerns
Ramos's view of the semiditone: "Modo numerus 162 ad 160
sesquioctogesimam perficit proportionem, qua sesquiquinta
proporci tonum excedit cum semitonio, quod repugnat
positioni Ramis Hispani indifferenter concludentis
semiditonum sesquiquinto intervallo proportione convenire."
Translation: "Only the number 162 to 160 perfects the
sesquioctoginta ratio [81:80], by which the sesquiquintan
ratio [6:5] exceeds the tone [combined] with the semitone.
This is contrary to the position of Ramis the Spaniard [who]
indiscriminately argues that the semiditone consists in the
interval with the sesquiquintan ratio [6:5]." In other
words, the ratio 6:5 of the pure minor third exceeds the
semiditone [32:27] by the ratio of 162:160, i.e., by 81:80.
See Gaffurius, De harmonia musicorum instrumentorum opus,
fol. 63r.

261. In Part 1, Treatise 1, Chapter 3, Ramos states
that the semitone is not really a semitone at all, and
refers to it as an "imperfect tone."

262. Strunk suggests that the reader work out the
entire scale for himself by adopting 288 as the length of
the whole string in order to restrict the measurement
entirely to integers. He notes that the scale of Ramos anticipates the "pure scale" later proposed by Fogliano and Zarlino; it is identical to the scale with the octave $F$ to $f$ that includes $B\flat$.

263. Strunk notes that Guido divides the monochord by two, four, and nine—never eight. Ramos is probably thinking of Boethius's justification to obtain the 9:8 ratio of the tone by working from the higher pitches toward the lower ones (i.e., adding eighths rather than subtracting ninths).

264. According to Ramos, the major semitone holds the ratio 16:15; the minor semitone holds the ratio 135:128.

265. Gaffurius's marginal annotation: "Subtilis materia et digna ingenio liberali, nostris cantoribus odiosa, sed musicis gratissima et utilis atque necessaria." Translation: "A subtle matter and suitable for a noble man of genius; annoying to our singers, but very pleasing and useful and necessary for musicians."

266. Ramos considers the first division of the monochord to be "incomplete" because it encompasses only the diatonic pitches; the "complete" monochord includes the chromatic pitches as well.

267. i.e., played harmonically.

268. i.e., played melodically.

269. Gaffurius's marginal annotation: "Haec sit brevis conclusio: Omnis tonus in chorda dispositus, cuius extremi soni sesquioctava proportione adducti incipient sonum distinguenter duo scilicet aequalia semitonia quovis modo, bonus est et rectus, etiamsi extremi soni coniuncti sint sive ficti." Translation: "Let this be a brief conclusion: Every tone that is placed on the string, whose outermost sounds have been drawn together by the sesquioctave ratio [and] that begin by distinguishing the sound with two [notes]—that is, equal semitones anywhere in anyway—is good and correct, even if the outermost sounds are conjunctae or ficta."

270. Gaffurius's marginal annotation: "Si mala semitonia malis in suis octavis recte correspondent, diapason optimam consonantiarum perficiunt, ergo bona. Sunt enim illa semitonia maiora, quorum intervalla consonantii incipientur, sicut et minor semitonia bona. Aliter omnes consonantiae essent imperfectae vel superfluae et dissonae etque indimensibiles." Translation: "If the bad semitones
properly correspond at their bad octaves, they complete the best of the consonants—the diapason; therefore, they are good. For those major semitones whose intervals are begun with consonants are good just like the minor semitones. Otherwise, all the consonants would be imperfect or, if you prefer, superfluous and dissonant, and consequently immeasurable."

271. lit., "fingerboards."

272. Both Barbour and Lindley translate this paragraph incorrectly. See Chapter IV of the commentary for a detailed discussion of this matter.

273. See Boethius, De institutione musica, Book I, Chapter 1, Friedlein edition, 183, lines 11ff.

274. The section from Credimus enim error illi sic . . . through Sed de his hactenus is omitted in the A-80 edition.

275. This sentence is found only in the A-80 edition.


277. Explicit is an abbreviation of the phrase Explicitus (est liber), which may be translated as "The book is ended."

278. This concludes the A-80 and A-7-35 editions dated 11 May 1482.

279. This concludes the A-81 edition dated 5 June 1482.
APPENDIX A

MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT

PART 2, TREATISE 1, CHAPTER 1
APPENDIX A

MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT

PART 2, TREATISE 1, CHAPTER 1
APPENDIX B
MUSICAL EXAMPLES OF FUGUE ACCORDING TO RAMOS
PART 2, TREATISE 1, CHAPTER 1
APPENDIX B

MUSICAL EXAMPLES OF FUGUE ACCORDING TO RAMOS

PART 2, TREATISE 1, CHAPTER 1

474

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
APPENDIX C

MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT

PART 2, TREATISE 1, CHAPTER 2
APPENDIX C

MUSICAL EXAMPLES OF RAMOS'S COUNTERPOINT

PART 2, TREATISE 1, CHAPTER 2

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
APPENDIX D

UGOLINO'S RULES OF COUNTERPOINT

WITH MUSICAL EXAMPLES
APPENDIX D

UGOLINO'S RULES OF COUNTERPOINT WITH MUSICAL EXAMPLES

"Regulae generales contrapuncti universalis quarum prima est
de unisono ascendendo unde datur versus sequens cum sui
contrapuncti demonstratione:\(^1\)
Tertia sit infra, unisonus si intenditur una.

\[\text{\includegraphics[width=\textwidth]{counterpoint_example1.png}}\]

Si tertia vel quarta tendit, infra diapente tenebit.

\[\text{\includegraphics[width=\textwidth]{counterpoint_example2.png}}\]

\(^1\)Ugolino d'Orvieto, *Declaratio musicae disciplinae*, 32-34.
Si quintam ascendit, diapason cantum terminabit.

Secunda regula de unisono descendendo: Tertia sit supra, unisonus si remittitur una.

Ad quintam tendit, si ternam quartamve remittit.
Octavam petit, si quintam vel ultra deponit. 
Si plura pertransit, rationis ordo docebit.

Tertia regula de tertia ascendendo:
Unisonus fiat, unam si tertia tendat.

Si plures intendat, tandem unisonus fiat.
Tertiam remittit, si ter vel quater ascendit.

Quarta regula de tertia descendendo:
Quinta tibi fiat, si terna solam remittat.

Si plures fuerint, eas quinta terminabit.
Si ternam vel quartam, octavam superintendas.

Quinta sexta fiet, si cum octava iungatur.

Quinta regula de quinta ascendendo:
Quinta quaerit ternam, si fit ascensus in unam.
Unisonum dicas, si ternam vel quartam intendas.

Sexta regula de quinta descendendo:
Octavam quinta petit, si solam unam descendit.

Erit octava, sexta, si alteri sit sociata.
Post quintam octava fiat, si ternam infra remittat.

Si quartam vel quintam, decimam intendere sinit.

Septima regula de sexta ascendendo:
Sexta ternam cupit, si supra notam intendit.
Octava regula de sexta descendingo:
Sexta vult octavam, infra si tendit ad unam.

Et plures fiant, si antecedunt octavam.

Vult decimam sexta tertiam remittens ad infra.
Nona regula de octava ascendendo:
Post octavam quintam, si cantus tenditur una.

Si quarta vel quinta salit, tertiam iure poscit.

Decima regula de octava descendendo:
Octava decimam, si solum deponit unam.
Tertia si fuerit, tunc duodecima fiat.

Undecima regula de decima ascendendo:
Decima vult octavam, unam duntaxat intensam.

Plura si transcendit, tunc quinta locum habebit.
Duodecima regula de decima descendendo:
Decima descendens duodecimam cupit habere.

Tertiadecima regula de duodecima ascendentio:
Unam intendens duodecima decimam quaerit.

Octavam terna quartaque, quinta quintamque sequentem.
Quartadecima regula de duodecima descendendo:
Quinta cum decima post duodecimam fiat.

Si societur, tertia cum decima detur.
Sed tertia cum decima quintam cum decima poscit."
APPENDIX E

CORRECTIONS TO THE MUSICA PRACTICA
### APPENDIX E
CORRECTIONS TO THE MUSICA PRACTICA

<table>
<thead>
<tr>
<th>LOCATION:¹</th>
<th>RAMOS:²</th>
<th>THIS EDITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prologue</td>
<td>Licet</td>
<td>Liceat</td>
</tr>
<tr>
<td>p. 194, line 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prologue</td>
<td>Heliseum</td>
<td>Eliseum</td>
</tr>
<tr>
<td>p. 195, line 46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prologue</td>
<td>Heliae</td>
<td>Eliae</td>
</tr>
<tr>
<td>p. 195, line 47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prologue</td>
<td>artus</td>
<td>artubus</td>
</tr>
<tr>
<td>p. 196, line 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C1³</td>
<td>sersim</td>
<td>arsim</td>
</tr>
<tr>
<td>p. 200, line 20</td>
<td></td>
<td>A-81 &amp; A-7-35</td>
</tr>
<tr>
<td>P1 T1 C3</td>
<td>cum termina</td>
<td>contermina</td>
</tr>
<tr>
<td>p. 209, line 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C3</td>
<td>copulentur</td>
<td>copulantur</td>
</tr>
<tr>
<td>p. 209, line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C3</td>
<td>principale</td>
<td>principalem</td>
</tr>
<tr>
<td>p. 210, line 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Corrected words are bracketed in the translation.

²Denotes all editions, unless otherwise noted.

³Denotes Part 1, Treatise 1, Chapter 1.

493
<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>RAMOS:</th>
<th>THIS EDITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 T1 C3</td>
<td>semitonio</td>
<td>semiditono</td>
</tr>
<tr>
<td>p. 211,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>prima</td>
<td>primae</td>
</tr>
<tr>
<td>P1 T1 C3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p. 212,</td>
<td>dicit</td>
<td>dicimus</td>
</tr>
<tr>
<td>line 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C3</td>
<td>gravitatem</td>
<td>gravitate</td>
</tr>
<tr>
<td>p. 213,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C3</td>
<td>Praedictae</td>
<td>Praecedentis</td>
</tr>
<tr>
<td>p. 215,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C4</td>
<td>tertium</td>
<td>secundum</td>
</tr>
<tr>
<td>p. 217,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C5</td>
<td>indigestaque</td>
<td>indigestaque</td>
</tr>
<tr>
<td>p. 222,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C5</td>
<td>nete</td>
<td>neten</td>
</tr>
<tr>
<td>p. 223,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C5</td>
<td>nete</td>
<td>neten</td>
</tr>
<tr>
<td>p. 224,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C6</td>
<td>obtundant</td>
<td>obtundunt</td>
</tr>
<tr>
<td>p. 226,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C6</td>
<td>lichanos</td>
<td>hypate</td>
</tr>
<tr>
<td>p. 229,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C6</td>
<td>ista</td>
<td>istae</td>
</tr>
<tr>
<td>p. 231,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>----------</td>
<td>--------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>P1 T1 C6</td>
<td>conclusisemus</td>
<td>conclusissemus</td>
</tr>
<tr>
<td>p. 232, line 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C7</td>
<td>ista</td>
<td>illa</td>
</tr>
<tr>
<td>p. 233, line 15</td>
<td>A-80 only</td>
<td></td>
</tr>
<tr>
<td>P1 T1 C7</td>
<td>scilicet</td>
<td>sed</td>
</tr>
<tr>
<td>p. 234, line 27</td>
<td>A-80 only</td>
<td></td>
</tr>
<tr>
<td>P1 T1 C7</td>
<td>aequisonantes</td>
<td>aequisonantibus</td>
</tr>
<tr>
<td>p. 236, line 38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C7</td>
<td>cantus</td>
<td>cantans</td>
</tr>
<tr>
<td>p. 237, line 19</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T1 C7</td>
<td>ut volumus</td>
<td>volumus, ut</td>
</tr>
<tr>
<td>p. 239, line 10</td>
<td>A-80</td>
<td></td>
</tr>
<tr>
<td>P1 T1 C7</td>
<td>est acutior</td>
<td>acutior est</td>
</tr>
<tr>
<td>p. 240, line 39</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T1 C8</td>
<td>sint</td>
<td>sunt</td>
</tr>
<tr>
<td>p. 242, line 36</td>
<td>A-80</td>
<td></td>
</tr>
<tr>
<td>P1 T1 C8</td>
<td>spera</td>
<td>sphaera</td>
</tr>
<tr>
<td>p. 243, line 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C8</td>
<td>celum stellatum</td>
<td>coeli stellati</td>
</tr>
<tr>
<td>p. 243, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C8</td>
<td>hanc</td>
<td>hac</td>
</tr>
<tr>
<td>p. 243, line 21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T1 C8</td>
<td>sententiam</td>
<td>sententia</td>
</tr>
<tr>
<td>p. 243, line 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td>P1 T1 C8</td>
<td>libro</td>
<td>libro</td>
</tr>
<tr>
<td>p. 245,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>percutimus</td>
<td>percurrimus</td>
</tr>
<tr>
<td>p. 247,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>continuo</td>
<td>continuae</td>
</tr>
<tr>
<td>p. 247,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>similis</td>
<td>similiter</td>
</tr>
<tr>
<td>p. 248,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>prima secunda</td>
<td>secunda</td>
</tr>
<tr>
<td>p. 250,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>c A-80</td>
<td>e A-81 &amp; A-7-35 C</td>
</tr>
<tr>
<td>p. 251,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>scandat</td>
<td>descendat</td>
</tr>
<tr>
<td>p. 252,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C1</td>
<td>sciet</td>
<td>scient</td>
</tr>
<tr>
<td>p. 252,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C4</td>
<td>positis</td>
<td>positae</td>
</tr>
<tr>
<td>p. 264,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C4</td>
<td>possit</td>
<td>potest</td>
</tr>
<tr>
<td>p. 264,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C4</td>
<td>ascendendo</td>
<td>descendendo</td>
</tr>
<tr>
<td>p. 266,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>provenit</td>
<td>proveniunt</td>
</tr>
<tr>
<td>p. 268,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line 30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>RAMOS:</th>
<th>THIS EDITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 T2 C5</td>
<td>altera</td>
<td>altero</td>
</tr>
<tr>
<td>p. 268, line 39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>praecedenti</td>
<td>in hoc</td>
</tr>
<tr>
<td>p. 270, line 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>quarta</td>
<td>quartam</td>
</tr>
<tr>
<td>p. 270, line 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>tertia</td>
<td>tertiam</td>
</tr>
<tr>
<td>p. 270, line 36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>p. 271, line 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>quarta</td>
<td>quartam</td>
</tr>
<tr>
<td>p. 271, line 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>secunda</td>
<td>secundam</td>
</tr>
<tr>
<td>p. 271, line 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>quadrata</td>
<td>quadratam</td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>p. 271, line 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>cogatur</td>
<td>cogantur</td>
</tr>
<tr>
<td>p. 274, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>c</td>
<td>f</td>
</tr>
<tr>
<td>p. 274, line 31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>existentes</td>
<td>existente</td>
</tr>
<tr>
<td>p. 274, line 33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>descendant</td>
<td>descendat</td>
</tr>
<tr>
<td>p. 274, line 34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>li</td>
<td>illud</td>
</tr>
<tr>
<td>p. 274, line 45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>quoniam</td>
<td>quod</td>
</tr>
<tr>
<td>p. 277, line 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>semitonii</td>
<td>semiditoni</td>
</tr>
<tr>
<td>p. 279, line 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>servet</td>
<td>servetur</td>
</tr>
<tr>
<td>p. 280, line 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>quia</td>
<td>quod</td>
</tr>
<tr>
<td>p. 281, line 29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C5</td>
<td>meliciem</td>
<td>mellitiem</td>
</tr>
<tr>
<td>p. 281, line 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C6</td>
<td>differre</td>
<td>differentes</td>
</tr>
<tr>
<td>p. 285, line 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C6</td>
<td>differunt</td>
<td>different</td>
</tr>
<tr>
<td>p. 286, line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C6</td>
<td>diatonum</td>
<td>ditonum</td>
</tr>
<tr>
<td>p. 289, line 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C7</td>
<td>anotare</td>
<td>annotare</td>
</tr>
<tr>
<td>p. 293, line 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C7</td>
<td>tertium</td>
<td>tertiam</td>
</tr>
<tr>
<td>p. 296, line 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C7</td>
<td>quinta</td>
<td>quintam</td>
</tr>
<tr>
<td>p. 296, line 38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>P1 T2 C7</td>
<td>convenientia</td>
<td>convenientiam</td>
</tr>
<tr>
<td>p. 296, line 39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C7</td>
<td>colocetur</td>
<td>colocetur</td>
</tr>
<tr>
<td>p. 298, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C7</td>
<td>negamus</td>
<td>negemus</td>
</tr>
<tr>
<td>p. 298, line 26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T2 C8</td>
<td>h b</td>
<td>h k</td>
</tr>
<tr>
<td>p. 302, line 30</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T2 C8</td>
<td>c e</td>
<td>e g</td>
</tr>
<tr>
<td>p. 302, line 35</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T2 C8</td>
<td>h b</td>
<td>h k</td>
</tr>
<tr>
<td>p. 302, line 35</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T2 C8</td>
<td>g b</td>
<td>g k</td>
</tr>
<tr>
<td>p. 303, line 7</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T2 C8</td>
<td>g k</td>
<td>g l</td>
</tr>
<tr>
<td>p. 303, line 46</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P1 T2 C8</td>
<td>sic sic</td>
<td>sic</td>
</tr>
<tr>
<td>p. 304, line 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C1</td>
<td>arato</td>
<td>quarto</td>
</tr>
<tr>
<td>p. 310, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C1</td>
<td>differentia</td>
<td>differentiam</td>
</tr>
<tr>
<td>p. 310, line 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C1</td>
<td>per chordam</td>
<td>chordam</td>
</tr>
<tr>
<td>p. 312, line 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>P1 T3 C1</td>
<td>diapente</td>
<td>diapason</td>
</tr>
<tr>
<td>p. 312, line 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C1</td>
<td>iam</td>
<td>in</td>
</tr>
<tr>
<td>p. 312, line 28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C2</td>
<td>g c</td>
<td>g d</td>
</tr>
<tr>
<td>p. 315, line 28</td>
<td></td>
<td>A-81 &amp; A-7-35</td>
</tr>
<tr>
<td>P1 T3 C2</td>
<td>tetrartus</td>
<td>tetrardus</td>
</tr>
<tr>
<td>p. 316, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C2</td>
<td>lectitiam</td>
<td>laetitiam</td>
</tr>
<tr>
<td>p. 318, line 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C3</td>
<td>tauronomitanum</td>
<td>Tauromenitanum</td>
</tr>
<tr>
<td>p. 321, line 20</td>
<td></td>
<td>A-80</td>
</tr>
<tr>
<td>P1 T3 C3</td>
<td>lectificando</td>
<td>laetificando</td>
</tr>
<tr>
<td>p. 323, line 10</td>
<td></td>
<td>A-80</td>
</tr>
<tr>
<td>P1 T3 C3</td>
<td>euterpees</td>
<td>Euterpen</td>
</tr>
<tr>
<td>p. 327, line 29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C3</td>
<td>eretico</td>
<td>haeretico</td>
</tr>
<tr>
<td>p. 328, line 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C3</td>
<td>atenuet</td>
<td>attenuet</td>
</tr>
<tr>
<td>p. 329, line 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1 T3 C3</td>
<td>dicetur</td>
<td>dicemus</td>
</tr>
<tr>
<td>p. 329, line 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C1</td>
<td>quia</td>
<td>quod</td>
</tr>
<tr>
<td>p. 337, line 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>--------------</td>
</tr>
<tr>
<td>P2 T1 C1</td>
<td>facere</td>
<td>fieri</td>
</tr>
<tr>
<td>p. 341, line 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C1</td>
<td>quoniam</td>
<td>quod</td>
</tr>
<tr>
<td>p. 341, line 18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C1</td>
<td>faciet</td>
<td>faciat</td>
</tr>
<tr>
<td>p. 342, line 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>prius</td>
<td>primo</td>
</tr>
<tr>
<td>p. 348, line 34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>ascendenti</td>
<td>ascendendo</td>
</tr>
<tr>
<td>p. 348, line 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>remittet</td>
<td>remittat</td>
</tr>
<tr>
<td>p. 350, line 26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>ascendente</td>
<td>ascendendo</td>
</tr>
<tr>
<td>p. 350, line 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>descendente</td>
<td>descendendo</td>
</tr>
<tr>
<td>p. 351, line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>decima</td>
<td>decimam</td>
</tr>
<tr>
<td>p. 351, line 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>quia</td>
<td>quod</td>
</tr>
<tr>
<td>p. 360, line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>fa</td>
<td>sol</td>
</tr>
<tr>
<td>p. 360, line 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2 T1 C2</td>
<td>3a</td>
<td>tertiam</td>
</tr>
<tr>
<td>p. 365, line 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td>P2 T1 C2 p. 365, line 41</td>
<td>unisonus</td>
<td>unisonum</td>
</tr>
<tr>
<td>P2 T1 C2 p. 365, line 42</td>
<td>4a</td>
<td>quarta</td>
</tr>
<tr>
<td>P2 T1 C2 p. 366, line 1</td>
<td>5a</td>
<td>quintam</td>
</tr>
<tr>
<td>P2 T1 C2 p. 366, line 8</td>
<td>4a</td>
<td>quarta</td>
</tr>
<tr>
<td>P2 T1 C2 p. 366, line 43</td>
<td>quinto</td>
<td>quarto</td>
</tr>
<tr>
<td>P2 T1 C2 p. 369, Figura 8 Row 5, Column 3</td>
<td>fa</td>
<td>sol</td>
</tr>
<tr>
<td>P2 T1 C2 p. 370, Figura 8 Row 5, Column 7</td>
<td>sol</td>
<td>la</td>
</tr>
<tr>
<td>P2 T1 C2 p. 370, Figura 8 Row 6, Column 8</td>
<td>ut</td>
<td>re</td>
</tr>
<tr>
<td>P3 T1 C1 p. 372, line 19</td>
<td>dividit</td>
<td>dividitur</td>
</tr>
<tr>
<td>P3 T1 C1 p. 373, line 21</td>
<td>semitonia</td>
<td>semiminima</td>
</tr>
<tr>
<td>P3 T1 C1 p. 373, line 21</td>
<td>cursee</td>
<td>cursea</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>RAMOS:</th>
<th>THIS EDITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3 T1 C1</td>
<td>minaria</td>
<td>minarea</td>
</tr>
<tr>
<td>p. 373, line 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>minaria</td>
<td>minarea</td>
</tr>
<tr>
<td>p. 374, line 26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>sequentis</td>
<td>sequente</td>
</tr>
<tr>
<td>p. 375, line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>tractum</td>
<td>tractu</td>
</tr>
<tr>
<td>p. 375, line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>cursua</td>
<td>cursea</td>
</tr>
<tr>
<td>p. 377, line 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>minariea</td>
<td>minarea</td>
</tr>
<tr>
<td>p. 377, line 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>circumvolentes</td>
<td>circumvolventes</td>
</tr>
<tr>
<td>p. 377, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>Ia</td>
<td>Ista</td>
</tr>
<tr>
<td>p. 378, line 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>sic</td>
<td>sed</td>
</tr>
<tr>
<td>p. 378, line 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>rationem</td>
<td>ratio</td>
</tr>
<tr>
<td>p. 378, line 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C1</td>
<td>quia</td>
<td>quod</td>
</tr>
<tr>
<td>p. 378, line 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C2</td>
<td>numeros</td>
<td>numeri</td>
</tr>
<tr>
<td>p. 381, line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>P3 T1 C2</td>
<td>reperimus</td>
<td>reperimus</td>
</tr>
<tr>
<td>p. 383, line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C2</td>
<td>qui</td>
<td>quod</td>
</tr>
<tr>
<td>p. 383, line 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C2</td>
<td>videmus</td>
<td>videtur</td>
</tr>
<tr>
<td>p. 384, line 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C2</td>
<td>Olregam</td>
<td>Ockeghem</td>
</tr>
<tr>
<td>p. 386, line 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>tres</td>
<td>tria</td>
</tr>
<tr>
<td>p. 388, line 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>fractionum</td>
<td>fractionum</td>
</tr>
<tr>
<td>p. 389, line 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>carissimus</td>
<td>carissimus</td>
</tr>
<tr>
<td>p. 389, line 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>denotans</td>
<td>denotas</td>
</tr>
<tr>
<td>p. 391, line 29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>Olregam</td>
<td>Ockeghem</td>
</tr>
<tr>
<td>p. 392, line 40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>L'homme arme</td>
<td>alome armet</td>
</tr>
<tr>
<td>p. 392, line 41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>Olregam</td>
<td>Ockeghem</td>
</tr>
<tr>
<td>p. 393, line 26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>fundatus</td>
<td>fundati</td>
</tr>
<tr>
<td>p. 395, line 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>-----------</td>
<td>--------</td>
<td>---------------</td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>2 3 3 2</td>
<td>3 3 2 2</td>
</tr>
<tr>
<td>p. 395, line 12</td>
<td>3 3 2 2</td>
<td>3 2 3 2</td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>divisionem</td>
<td>divisione</td>
</tr>
<tr>
<td>p. 398, line 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C3</td>
<td>pausas binas</td>
<td>pausae binae</td>
</tr>
<tr>
<td>p. 399, line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>summe</td>
<td>sume</td>
</tr>
<tr>
<td>p. 400, line 42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>deprimitur</td>
<td>deprimatur</td>
</tr>
<tr>
<td>p. 401, line 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>salmansie</td>
<td>Salmantiae</td>
</tr>
<tr>
<td>p. 401, line 32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>aliqua</td>
<td>alia</td>
</tr>
<tr>
<td>p. 402, line 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>noculam</td>
<td>voculam</td>
</tr>
<tr>
<td>p. 402, line 18</td>
<td>A-80</td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>computando</td>
<td>computamus</td>
</tr>
<tr>
<td>p. 403, line 34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>agamenon</td>
<td>Agamemnon</td>
</tr>
<tr>
<td>p. 403, line 38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>secuntur</td>
<td>sequuntur</td>
</tr>
<tr>
<td>p. 404, line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>est</td>
<td>de</td>
</tr>
<tr>
<td>p. 405, line 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCATION:</td>
<td>RAMOS:</td>
<td>THIS EDITION:</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>P3 T1 C4</td>
<td>diximus</td>
<td>dicimus</td>
</tr>
<tr>
<td>p. 405, line 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C1</td>
<td>tertius</td>
<td>secundus</td>
</tr>
<tr>
<td>p. 407, line 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C2</td>
<td>aequivum</td>
<td>aequum</td>
</tr>
<tr>
<td>p. 413, line 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C3</td>
<td>superponentes</td>
<td>superponens</td>
</tr>
<tr>
<td>p. 418, line 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C3</td>
<td>h:k:d</td>
<td>q d</td>
</tr>
<tr>
<td>p. 420, line 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>nonum</td>
<td>quartum</td>
</tr>
<tr>
<td>p. 423, line 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>tonus</td>
<td>tonum</td>
</tr>
<tr>
<td>p. 423, line 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>tecle</td>
<td>taedae</td>
</tr>
<tr>
<td>p. 427, line 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>procedunt</td>
<td>procedant</td>
</tr>
<tr>
<td>p. 427, line 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>tecle</td>
<td>taedae</td>
</tr>
<tr>
<td>p. 427, line 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>varo</td>
<td>vero</td>
</tr>
<tr>
<td>p. 430, line 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>lachonica</td>
<td>Laconica</td>
</tr>
<tr>
<td>p. 430, line 35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
<table>
<thead>
<tr>
<th>LOCATION:</th>
<th>RAMOS:</th>
<th>THIS EDITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3 T2 C4</td>
<td>efficit</td>
<td>officiebat</td>
</tr>
<tr>
<td>p. 430, line 38</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>moliciem</td>
<td>mollitiem</td>
</tr>
<tr>
<td>p. 430, line 40</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>P3 T2 C4</td>
<td>imponemus</td>
<td>imponamus</td>
</tr>
<tr>
<td>p. 431, line 9</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>Epilogue</td>
<td>composuimus</td>
<td>composuerimus</td>
</tr>
<tr>
<td>p. 433, line 7</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>Epilogue</td>
<td>discedendo</td>
<td>discutiendo</td>
</tr>
<tr>
<td>p. 433, line 28</td>
<td>A-81 &amp; A-7-35</td>
<td></td>
</tr>
<tr>
<td>Epilogue</td>
<td>quatrigentesimo</td>
<td>quadringentesimo</td>
</tr>
<tr>
<td>p. 435, line 26</td>
<td>octuagesimo</td>
<td>octogesimo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A-80</td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY

Primary Sources


Secondary Sources


508


________. *De institutione musica*, ed. by Godofredus Friedlein. Lipsiae: Teubneri, 1867.


______. Música Práctica. Translation from Latin to Spanish by Clemente Terni. 2 vols., Viejos Libros de Musica XVI. Madrid: Joyas Bibliográficas, 1983.


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


